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SENILE CHANGES AND DEGENERATIONS OF THE HUMAN EYE*

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The eye is subject to changes in all of its tissues with advancing age. In some ocular structures these variations manifest themselves by alterations in function, in others by visible degenerative disturbances, while at other times tissue changes can be seen only on microscopic examination. It is important to be able to recognize these senile variations clinically, so as to distinguish them from pathological lesions. However, this is often a difficult matter, for numerous diseases of the eye are most common in those years when senile changes occur, and it is of interest to attempt to relate the aging phenomena to the etiology of the disease. This paper is an attempt to review the subject of ocular senility, together with its relation to certain types of degenerative disease. The changes that occur in each tissue with the advance of years will be discussed from both the clinical and pathological viewpoint, and an attempt made to determine which factors are common to all of the ocular structures.

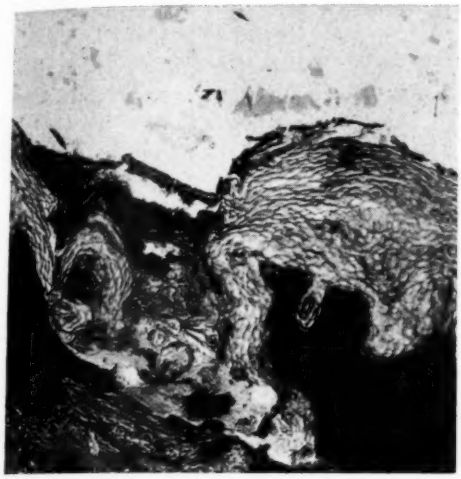

Fig. 1 (Rones). Hyperkeratosis of the lid epithelium.

It must be borne in mind that the relationship between tissue age and chronological age is not an exact one. Some individuals have advanced senile changes in their tissues at 40 years of age, while in others there is singularly little evidence of this at 80. In a similar manner, the

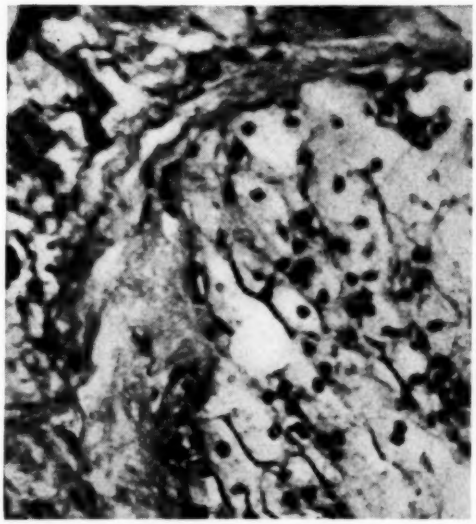

Fig. 2 (Rones). Xanthelasma, showing nest of large fat-laden cells.

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eyes will show these variations in different degrees. Nevertheless it will be found that in every individual past the age of 40 years the ocular tissues will show alterations that fall into the senile classification, even though they are only in the beginning stages. The boundary between the normal and the senile is also very difficult to define, as exemplified in the continued growth occurring in the lens throughout life.

Fig. 3 (Rones). Pinguecula. The epithelium is irregular, and beneath the thinned subepithelial tissue there is a mass of hyalinized connective tissue.

The changes due to age in the various ocular structures will be discussed in order.

Lids

The skin becomes thin and, due to the disappearance of the fat and muscle tissue beneath it, is thrown into wrinkles. These "crow's feet" are especially prominent at the outer angles of the eyes. Folds and pouches are formed in the lower lids, owing to a disappearance of the elastic fibers with an increase in the collagenous fibers. The variations in the tone of the musculature will produce the ectropion or entropion so commonly seen in the elderly. Localized areas of hyperkeratosis (fig. 1) occur in the epithelium of the skin, and at times reach considerable proportions. Xanthelasma (fig. 2) is a frequent occurrence along the inner angles of the lids, especially in women, and is regarded as the result of a disturbance of the cholesterol metabolism. Sections will show these yellow plaques to be due to nests of "xanthelasma cells" beneath the epithelium; the cells being large and foamy and being made up almost entirely of fat, stain red with Sudan. This is not definitely a senile consequence, but does occur with far greater frequency in the aged.

Conjunctiva

The most common and outstanding senile change in the conjunctiva is the pinguecula (fig. 3). This appears as a yellowish, slightly elevated spot, usually on both the nasal and temporal sides of the bulbus, but much more often nasally. Contributory factors for its occurrence are exposure to light, dust, and weather conditions. It is usually situated close to the limbus and rather firmly fixed to the underlying tissue. Because of the yellow color it was supposed to be a fatty degeneration. E. Fuchs, however, carefully investigated this problem and found the subepithelial tissue to be considerably thinned, with an absence of vessels. Beneath this zone was present the characteristic tissue; namely, a hyaline degeneration of the collagenous fibers and deposits of an amorphous hyaline material together with a proliferation and subsequent degeneration of the elastic fibers. No fat was present. The overlying epi-

thelium is thicker in some places, and thinner in others. Considerable changes are present in the conjunctival vessels in the neighborhood of the pinguecula; in some zones the vessel walls are considerably thickened and have an occluded lumen, while adjacent vessels show varicose dilatation. The sclerosis of the conjunctival vessels, plus the factors of external irritation, are looked upon as the causative agents.

The subconjunctival tissue is looser in youth than in old age, at which time considerable fat is found in the connective-tissue cells and along the connective-tissue fibers. This fat accumulates in the largest amounts in the neighborhood of the larger vessels and around the insertions of the ocular muscles. The nerves in the subconjunctiva show degenerative changes both in the medullary sheaths and in the nerve fibers. This is most marked around the limbus, and probably accounts for the fact that in elderly individuals the peripheral cornea is less sensitive than the center.

The pigmentation of the conjunctiva and limbus increases with age, though this varies considerably in different races. The pigment granules are present in the basal and deeper epithelial layers, and are most extensive around the limbus.

Cornea

Arcus senilis is the most evident of all senile changes of the eyes. Clinically it is seen as a zone of opacity in the periphery of the cornea, separated from the limbus by a narrow band of comparatively clear cornea and showing a sharply defined margin on this side. The margin towards the center is much more indefinite and shades off gradually into the clear tissue. Though the advanced arcus encompasses the entire circumference of the cornea, in its earlier stages it is usually present as an opaque zone above and below, each of which extends laterally until they unite to form the complete ring.

The anatomical basis for the arcus has caused considerable dispute. His and Virchow believed fat deposition to be the essential factor. In the opinion of Fuchs, however, the changes in the cornea were similar to those occurring in the conjunctiva as found in the pinguecula; namely, the presence of hyaline granules which were not soluble in either alcohol or ether, and did not stain with osmic acid. Takayasu, using Sudan III stain, demonstrated an infiltration of fat droplets both in the stroma and in Bowman's membrane. Parsons confirmed this work, and definitely established that the arcus is due to an infiltration of fat globules which stain well with Sudan III and Scharlach R, but only slightly with osmic acid, and are soluble in alcohol and ether.

Microscopically it can be seen that the arrangement of the fat droplets produces the clinical characteristics of the arcus. Bowman's membrane normally does not extend to the extreme periphery of the cornea. This point of termination marks the sharp peripheral border of the arcus, for the membrane is heavily laden with fat globules (fig. 4), while the corneal tissue peripheral to this is comparatively free and appears clear. In the substantia propria the infiltration is densest in the layers beneath Bowman's membrane, and posteriorly in those layers just in front of Descemet's membrane, leaving only a lighter infiltration in the central zone of the stroma. On cross-section the arrangement will be seen to be somewhat diagonal, from the more centrally placed anterior deposits backward and outward to the more peripheral posterior ones. In the well-advanced cases fat globules are found in Descemet's membrane, and even in the endothelium.

Versé fed animals a high cholesterol

diet and was able to produce in them an opacity similar to the arcus senilis, due to a deposition of fat in the corneal cells. Investigating the cholesterin content of the blood in humans with arcus, he found that a slight elevation existed. However, analysis of the lipoids present in arcus shows that only a small fraction is cholesterin. Thus, although a disturbance of the cholesterin metabolism is of importance, it probably plays its chief role in causing the deposition of neutral fats. In newborn babies and children, no fat substances staining with Sudan are visible in the cornea. At about 25 years of age, however, Bowman's membrane will be found to stain, and fine droplets of fat will be seen in and between the corneal lamellae, chiefly localized just beneath the outer end of Bowman's and in front of Descemet's membranes. With increasing years this fatty infiltration encroaches upon the central lamellae, and after 50 years the entire thickness of the periphery of the cornea is involved. Because of its development, the fatty infiltration is presumed to arise from the superficial and deeper marginal networks of vessels, and to be deposited at the points where the filtration pressure from the vessels is ineffective, and the nutrient fluids to the cornea diminished.

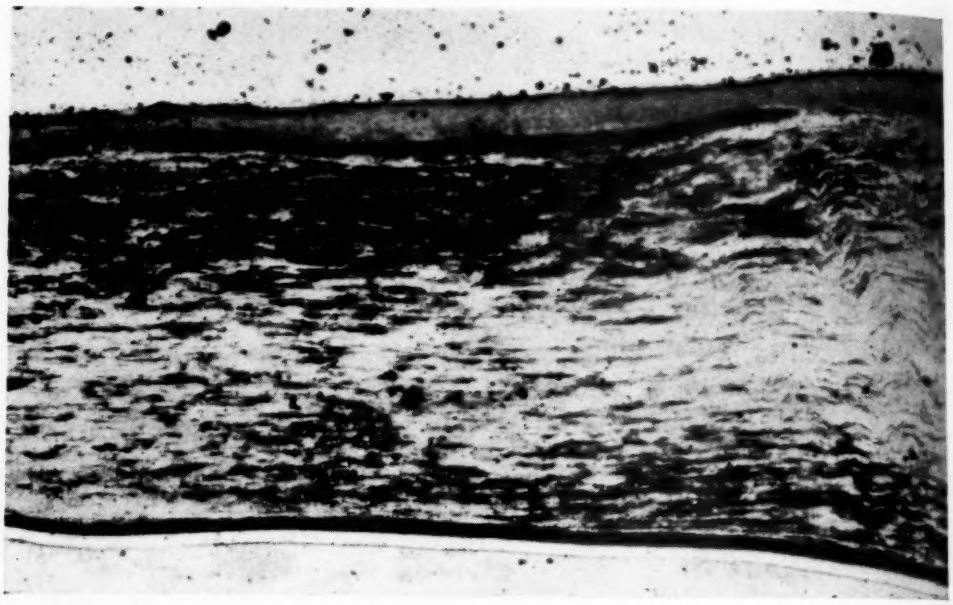

Fig. 4 (Rones). Arcus senilis. This fat stain shows Bowman's membrane to be heavily laden with fat. The point of termination of this membrane is well seen. In the corneal stroma the greatest concentration of fat is beneath Bowman's membrane and in front of Descemet's. The latter is also deeply infiltrated.

Descemet's membrane loses its fairly uniform thickness with advancing years, and shows areas of thickening and protruberance. Small colloid excrescenses (Hassal-Henle warts) are seen (fig. 5), being analagous to the drusen of the lamina vitrea of the choroid. These are found at the periphery of the membrane, but more often are seen with the slitlamp to cover the entire center of the cornea (cornea guttata). Histologically they are seen to be small hemispherical projections from the inner surface of Descemet's membrane. The endothelium of elderly

individuals shows a considerable variation in the size of the cells, and the nuclei show a variety of size, form, and staining difference. Over the nodular thickenings of Descemet's membrane the endothelium is thinned, but is intact.

Pigment dust is rarely lacking on the posterior corneal surface of elderly individuals, when this tissue is viewed with the corneal microscope. It is usually scattered diffusely, but at times will form a horizontal line just below the center, not reaching the limbus (Stahli's line). Due to the thermal currents in the aqueous this pigment is at times deposited in vertical lines in the center of the cornea (Krukenberg's spindle and Türk's line).

Related to the senile corneal changes are several noninflammatory pathological conditions. Senile marginal atrophy is practically always associated with an arcus. Without inflammatory signs, a furrow develops between the arcus and the limbus, usually above. The inner margin of the furrow is steep, while the outer one slopes gradually to its floor. With the passage of years the furrow tends to encircle the periphery and increase in width, causing a thinning of its floor. Histological examination has shown the first stage to be a loosening and fragmentation of the corneal lamellae. The consequent loss of tissue can be replaced by connective tissue. Descemet's membrane is at first intact and forms the floor of the furrow, but later this becomes thinned. Even with low intraocular pressures there develops ectasia of Descemet's membrane, which can easily be ruptured by trauma. The cause of this condition is not known.

Band-shaped opacity of the cornea occurs in a secondary form in phthisical eyes, and in a rarer primary form in elderly people, in whom it is bilateral and the eyes otherwise healthy. It first appears on each side at the limbus, from

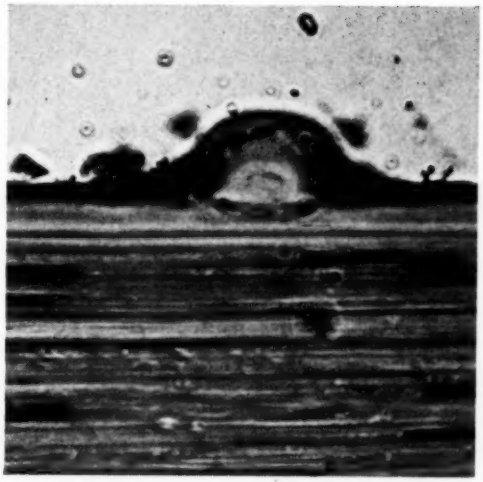

Fig. 5 (Rones). Colloid excrescence on Descemet's membrane.

which it is separated by a thin zone of clear tissue. From these two ends the opacities slowly advance towards the center, where they unite and form a horizontal superficial band in the lid-fissure zone. The primary type has never been examined microscopically. The secondary type, however, shows a formation of fibrous tissue anterior to the fragmented Bowman's membrane, and the covering epithelium is thickened and degenerated. Calcareous granules and colloid globules are found on Bowman's membrane.

Sclera

The senile changes of the sclera are characterized chiefly by fatty infiltration (fig. 6), greatest in the anterior and posterior parts of the bulbus and with little involvement of the equatorial region. Frequently there is found the deposition of fine granules of calcium salts in the posterior segment of the bulbus. The connective-tissue bundles show some widening and sclerosis, with a diminution in the number of nuclei. A definite degeneration of the elastic tissue occurs. The vessels of the sclera and episclera seem to be surrounded by fat droplets, and the

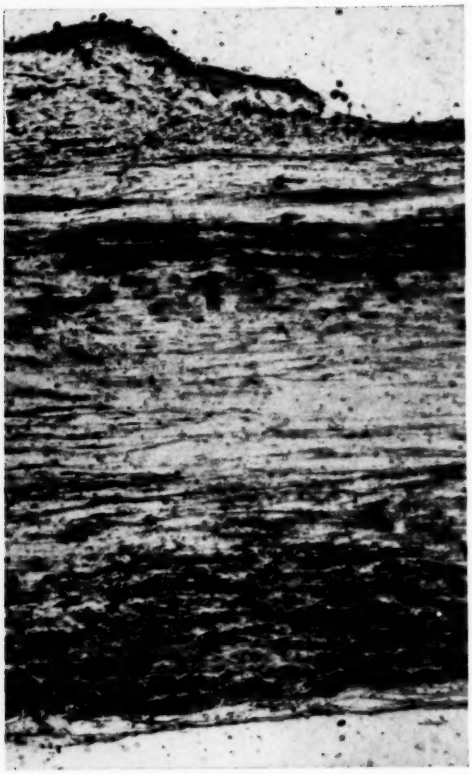

Fig. 6 (Rones). Fat stain of sclera to show the infiltration of fat.

arteries particularly show evidence of sclerosis.

The sclera is not frequently involved in degenerative changes in old age. Occasionally there is seen considerable calcification, and rarely even bone-formation, but these events are usually associated with inflammatory symptoms. However, van der Hoeve described a condition of degenerative hole-formation in the sclera without evidence of inflammation, which he designated scleromalacia perforans. This occurs in elderly individuals, many of whom have chronic rheumatic polyarthritis. Areas of softening may occur in any portion of the sclera, and with the discharge of the detritus, large gaping defects occur. This is not accompanied by pain, but secondary infection usually causes the eye to be removed.

Pectinate ligament

The fibers of the pectinate ligament form the inner wall of Schlemm's canal, and the aqueous filters through the spaces of Fontana into the canal. With advancing years the fibers of the ligament become thicker and sclerosed. Pigment granules originating from the epithelium of the iris and ciliary body become enmeshed in the fibers, and at times the accumulation of pigment is quite considerable. The thickened and pigmented pectinate ligament undoubtedly loses efficiency as a filtration mechanism, but as to whether this plays a role in the etiology of glaucoma simplex, as has been suggested, it is difficult to say.

Iris

Since the advent of the corneal microscope, the senile changes in the iris have been subjected to considerable study. A very common finding is the disappearance of the pigment epithelium at the pupillary margin, leaving a whitish and ill-defined border having a hyalinized appearance (fig. 7). The histologic changes of the pupillary margin are noteworthy, for therein lies the probable explanation of the senile miosis and rigidity of the pupil. The connective tissue between the sphinc-

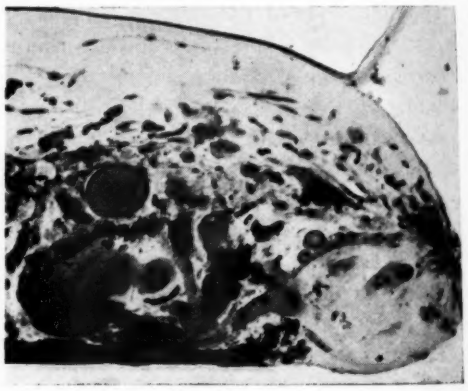

Fig. 7 (Rones). Atrophy of pigment epithelium at margin of iris, and hyalinization of connective tissue beneath the sphincter.

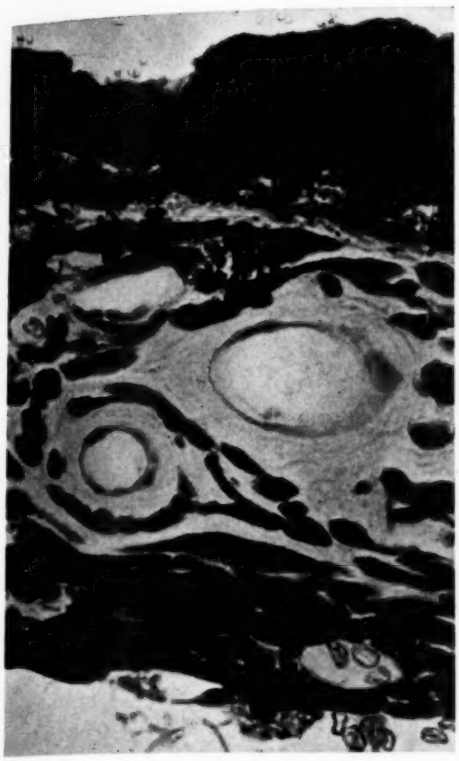

Fig. 8 (Rones). Arteriosclerosis in the iris.

ter and the pigment layer becomes thicker, and in advanced cases hyalinized. Although the muscle fibers of the sphincter appear unchanged, the intervening septa become involved in this hyalin alteration. At times this layer of hyalinized connective tissue beneath the sphincter can become quite thick, forming an elevated ring around the pupil. Atrophy of the mesodermal portion of the iris is also frequently seen. Clinically this becomes manifest as thinning or even hole formation in the body of the iris, and is best seen by transillumination. Hyalin degeneration of the dilator-muscle fibers is at times present, and probably accounts for the difficulty in producing dilatation of the pupil in the elderly.

The most noteworthy senile alteration in the iris is found in the blood vessels, which show varying amounts of sclerosis (fig. 8). The adventitia is considerably thickened and hyalinized, so that it is difficult to differentiate from the hyalinized connective tissue surrounding the vessels. The media partakes in this change, but the intima shows very little alteration. There is only slight narrowing of the lumen, and practically none of the vessels show any tendency to obliteration.

The pigment epithelium is not markedly involved except at the pupillary margin, where it atrophies. At other places there may be a localized proliferation (fig. 9) forming an isolated excrescence, or else there is a tendency to vacuolation. The endothelium covering the anterior surface of the iris loses its cellular form and becomes converted into a fine structureless membrane. Deposition of fat does not occur in the iris in old age.

Ciliary Body

The changes in the ciliary body in advanced age have been carefully studied by Attias and by Kerschbaumer. It must be borne in mind that the size of the ciliary body varies in hyperopia, emmetropia, and myopia, so that comparisons between youth and age must be made upon eyes with comparable states of refraction. In the old, it will be seen that the fibers of the ciliary muscle are thinner and the nuclei sparser, with an increase

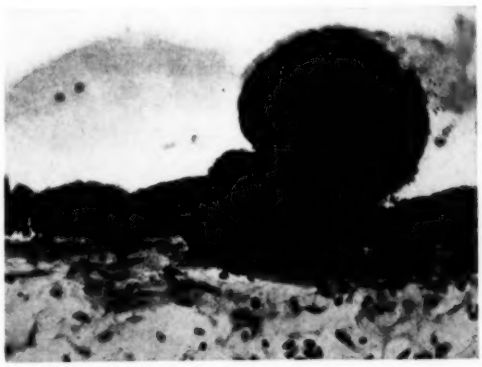

Fig. 9 (Rones). Proliferation of the pigment epithelium of the iris.

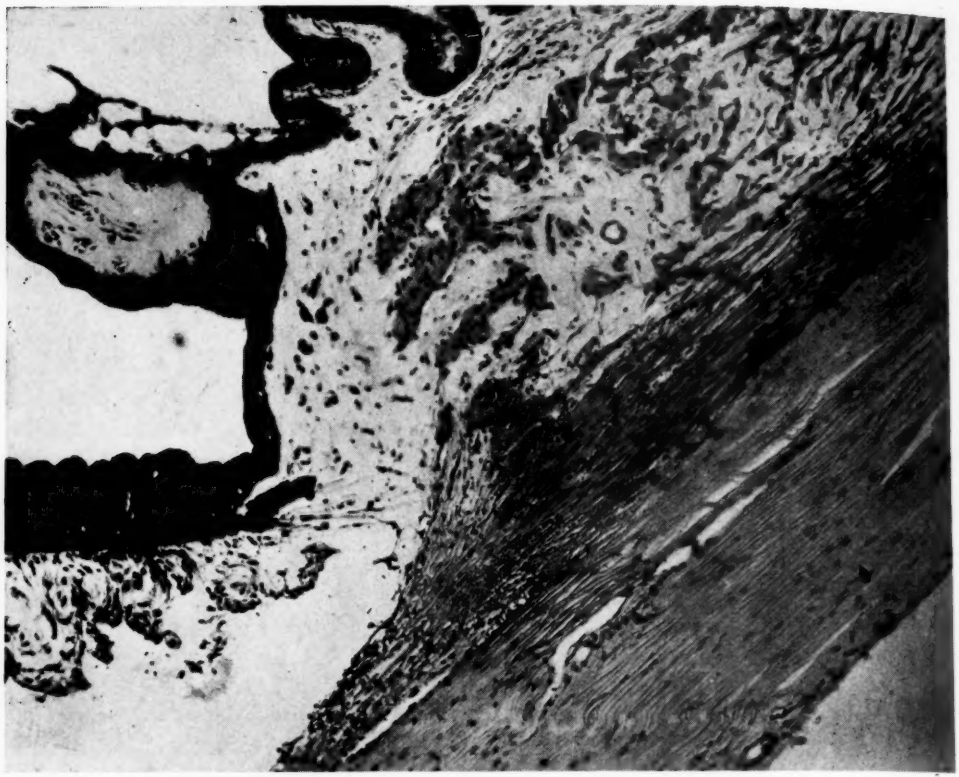

Fig. 10 (Rones). The ciliary muscle shows atrophy of the muscle fibers with an increase of connective tissue between the fibers. The ciliary processes are completely hyalinized. The pectinate ligament is sclerosed and numerous pigment granules are enmeshed in it.

in the connective tissue between the fibers (fig. 10). In the very old the interfibrillar tissue becomes hyalinized and involves the muscle fibers also, so that numerous atrophic fibers are seen. When stained with Sudan, the muscle fibers usually show a yellow-orange coloration, with numerous fat droplets within and between the fibers. Calcium granules are also frequently seen in the interfibrillar spaces. The deposition of fat in the fibers of the muscle unquestionably impairs its function, and is thus of importance in the production of presbyopia.

The ciliary processes become elongated and more numerously branched, and tend to run forwards and inwards towards the iris, which they parallel for a short distance. This produces a volumetric increase which narrows the posterior chamber and pushes the iris root forwards. In observing the anterior chambers of elderly individuals with normal intraocular pressure, it is frequently seen that there is no shallowing in the center, but that peripherally the iris root is pushed forwards considerably towards the cornea. Whether or not such individuals are more susceptible to glaucoma it is difficult to say, although it has been maintained that the increased volume of the ciliary processes causes the chamber angle to be blocked and thus retards the egress of the aqueous.

The stroma of the ciliary processes during youth consists of a loose, cellular connective tissue containing many blood vessels. With age, this connective tissue

becomes denser and the cells less numerous. Areas of hyalinization appear in the thicker processes, and in advanced cases the entire stroma is changed into a homogeneous hyalin mass. At first the vessels show a fibrous thickening of their walls, which then become hyalinized, the lumen becoming narrowed. Later there is obliteration of many of the vessels, with compensatory dilatation of the few remaining ones. Staining with Sudan shows the stroma to be filled with fat droplets.

The basal membrane increases in thickness and loses its homogeneous appearance, becoming granular and less glistening. Fat is only rarely seen in this membrane, but calcium granules are frequently found.

The pigment cell layer of the processes shows a variation in the size of the cells, and areas of proliferation where the layer partakes in the changes occurring in the nonpigmented epithelium. When bleached, the cells of the pigment layer are found to contain many fatty granules.

More important are the changes found in the nonpigmented epithelium. In youthful eyes this forms a unicellular layer covering the ciliary body and its processes. In old age this layer undergoes hyperplasia, forming small and irregular elevations. Through progressive hyperplasia there arise either large flat excrescences, or knoblike ones attached to the processes by short or long stalks. In the latter type a lumen is frequently visible. The pigment epithelium partakes in this hyperplasia and the pigmented cells can be seen interspersed with the nonpigmented. As the lumina enlarge they tend to coalesce, so that there are formed large cystlike structures attached to the ciliary processes (figs 11 and 12). Though the epithelial hyperplasia is definitely a senile phenomenon, it is by no means certain that these cysts belong to the same classification. The nonpigmented epithelium contains considerable amounts of fat droplets. This fatty deposition in the ciliary epithelium is probably the result of the sclerotic changes in the vessels of the processes. Unquestionably, these damaged cells cannot

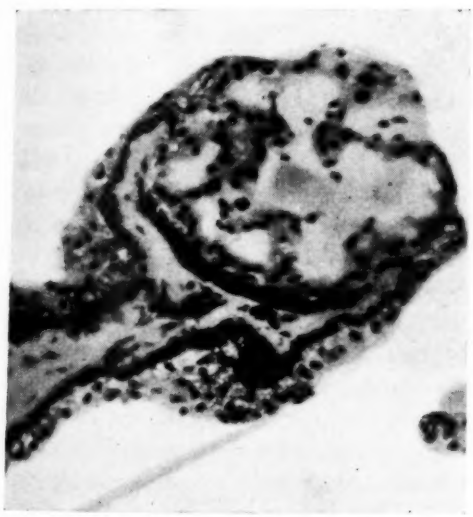

Fig. 11 (Rones). Section of a ciliary process showing marked proliferation of the nonpigmented epithelium with beginning cyst formation.

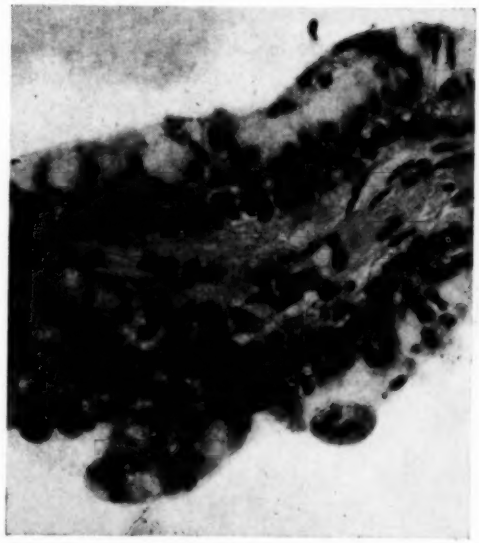

Fig. 12 (Rones). Cross section of a ciliary process showing both the pigmented and nonpigmented epithelium participating in the hyperplasia.

properly perform their function as a dialyzing membrane for the formation of the aqueous. Just what change occurs in the aqueous, and its influence on the nutrition of the lens, is as yet unknown, but therein lie some of the answers to the glaucoma and cataract problems.

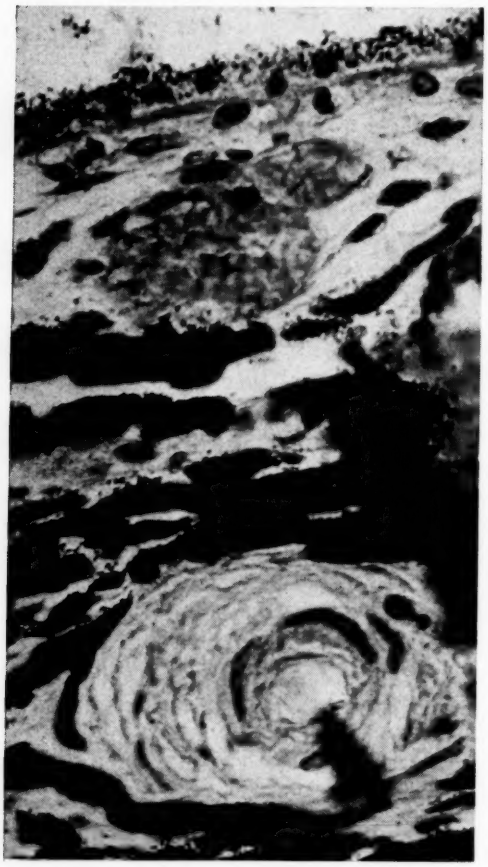

Fig. 13. (Rones). Arteriosclerosis in the choroid.

Choroid

In the choroid the evidence of old age is found particularly in the blood vessels, though the lamina vitrea and the contiguous pigment epithelium of the retina are also involved. Ophthalmoscopic examination of the fundus of a lightly pigmented young individual will show an extensive delicate capillary network of fairly even caliber, and of greatest density in the macular zone. Larger arteries will be seen branching into this capillary mesh, and these also show thin and delicate walls. In elderly people, however, this capillary net is found to be much more irregular, and many caliber variations are visible, some vessels being almost occluded while others exhibit compensatory dilatation. The arteries also are seen to vary in their caliber, and their walls show definite thickening. Where an artery is found to be occluded, the entire zone of choriocapillaris which it feeds is found to be atrophied, while an adjacent zone may appear to be quite normal.

Kerschbaumer found that this process of angiosclerosis began in certain of the small and median arteries of the choroid. There occurs first a fatty deposition in the intima, and this progresses in the form of a hyperplastic intimal thickening, with a resultant connective-tissue proliferation which narrows or even occludes the lumen of the vessel. The vessels take the appearance of whitish, opaque tubes with thick striated walls (fig. 13). The choriocapillaris, which is supplied by these arteries, then also begins to show thickenings in the walls, and narrowing and occlusion of the lumen. The sharp contour of the capillary wall becomes ill defined. Due to the thickening of the walls, the capillary interspaces become considerably narrowed. Since this change in the choriocapillaris is dependent upon the initial disturbance in the arteries which supply it, and since all of these arteries are not equally involved, it follows that the atrophy of the capillary layer occurs in a very patchy manner, and that in the regions adjacent to the atrophy the capillaries become dilated to compensate for the flow of blood through them.

The veins are essentially similarly in-

volved, although less intensively and at a later stage than the arteries. The perivascular spaces of the veins show many endothelial cells loaded with fat, and due to the increased amount of connective tissue, the venous walls are considerably thickened. The same changes are found in the vortex veins and in the short ciliary arteries.

The role played by the choriocapillaris in the nutrition of the retina is of the utmost importance, and consequently any great impairment of its function must necessarily exercise a deleterious influence upon its dependent tissues. The pigment epithelium is an early sufferer from this diminished circulation, and its changes are partly of a proliferative and partly of a degenerative nature (fig. 14). Many of the cells increase considerably in size, so that the layer loses its regular appearance. Though there is evidence of cellular division, many cells show signs of degeneration, with pale vacuolated nuclei. There is also considerable variation in the pigment content of the cells, and many of them lose all of their pigment. The pigment granules do not have their normal rod form, but become small and round, and with the destruction of the cells are scattered over the basal membrane. This irregularity and clumping of pigment is an easily observable fact in the fundus of the aged.

These changes in the pigment epithelium stand in causal relationship to those in the lamina vitrea, the most characteristic of which are the "drusen," or colloid excrescences. Ophthalmoscopically these are seen in elderly people as numerous bright, sharply circumscribed points with slightly pigmented margins, and usually in the macular zone or around the papilla. In some cases the discrete points become confluent and of rather large size. The majority of these individuals have no visual disturbances, but when the dots are very numerous and fused, there can result a diminution of the visual acuity by a pressure atrophy of the rods and cones. Histologically

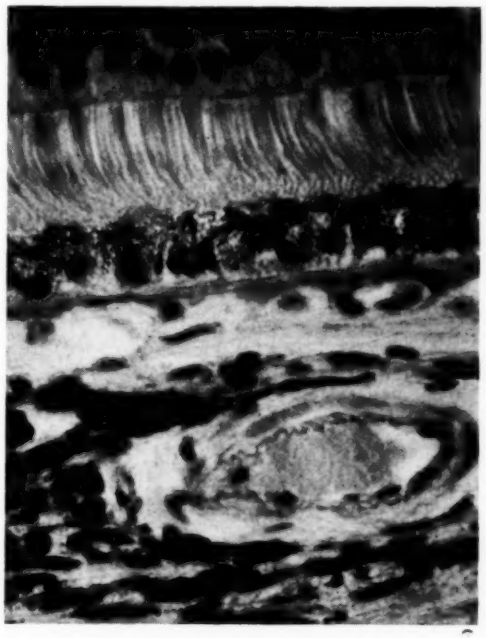

Fig. 14 (Rones). Irregularity of the pigment epithelium with clumping of granules resultant upon arteriosclerosis in the choroid.

the lamina vitrea is seen to consist of two layers, an outer or elastic layer, and an inner or cuticular layer. In old age this cuticular layer becomes thicker and irregular, losing its glistening appearance. Numerous refractile granules are seen, and the clumping of these granules gives rise to the drusen, forming elevations of varying form and height. Smaller drusen are often covered with normal-appearing pigment epithelium, but over the larger ones the epithelial coating is flattened or even lacking. In their initial stage the drusen have a finely granular appearance, but later they resemble hyalin. The older nodules lose their homogeneous aspect and show a concentric lamination, and calcium deposition and even bone formation can occur in them. Iso-

lated nodules can attain a large size, or by fusion can produce considerable masses.

Although many theories have been offered for their origin, only two have enough evidence in their favor to warrant discussion. The first, or transformation theory, is based upon the transformation of the pigment-epithelium cells into the hyaline masses. It has been offered in favor of this theory that many of the colloid bodies show no connection with the lamina vitrea, which appears to pass unchanged beneath them. Against this view is the fact that the nodules remain covered with pigment epithelium even when they have attained considerable size, which consequently indicates that the excrescences originate beneath the epithelium and have elevated it. Coats makes out a strong case in favor of the second, or deposition theory. First he offers the analogy of the excrescences on Descemet's membrane and the lens capsule, which he believed to be definitely produced by the endothelial cells on the posterior corneal surface, and by the cells of the lens epithelium, respectively. He also showed that the chief objection offered to this theory, that the lamina vitrea is seen to pass intact beneath the drusen, is not a valid one. By differential staining he was able to demonstrate that the drusen were actually connected with the homogeneous lamina vitrea, the outer lamina elastica remaining uninvolved and passing intact beneath the excrescence.

Retina

The retina of children and young adults has a glistening transparency when viewed with the ophthalmoscope, and there are many dancing light-reflexes on its inner surface. With advancing age, however, the retina becomes less transparent, due apparently to a thickening of the limiting membranes and Müller's fibers. The most striking senile changes in the retina occur at the ora serrata, in the macular region, and in the blood vessels.

In old age there is frequently seen an atrophy of the retinal periphery, with a decrease in the nerve fibers, ganglion cells, and inner nuclear layer, together with a disappearance of the rod and cone elements and a hypertrophy of connective tissue. The pigment epithelium becomes sparser, and pigment granules wander into the retina. These changes have been offered as an explanation of the concentric contraction of the visual field often seen in old people who show no disturbance of the optic nerves.

More striking than the atrophic changes are the cystic degenerations in the retinal periphery, which are found with great frequency in the elderly, though occasionally seen in young individuals. In the early stages small spaces appear in the outer nuclear layer.

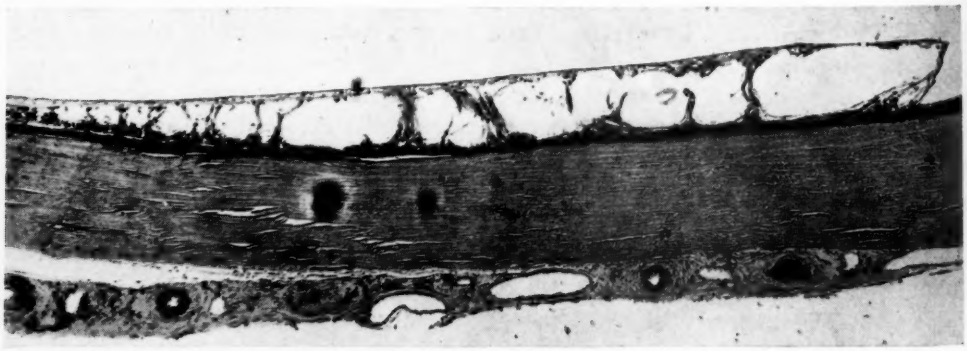

Fig. 15 (Rones). Cystic degeneration of the retina at the ora serrata.

Similar spaces then become visible in the inner nuclear layer, and for a time these two layers are separated by a thin septum. The disappearance of this septum causes the retina to appear as two thin sheets with delicate membranes stretching between them, forming large cystic spaces. On section, these spaces are usually found to be empty, though at times an albuminous coagulum is seen in them. As a rule these changes involve a larger area on the temporal side than on the nasal, but they never extend back far enough towards the equator to be visible with the ophthalmoscope (figs. 15 and 16). There has been considerable speculation as to the role played by these cystic spaces in producing detachment of the retina. The view has been advanced that tears in the thin inner limiting membrane allow the vitreous to seep down into the retina, and that the rotatory movements of the eyeball cause it to dissect the retina away from the choroid. At times such cystic spaces can also be found in the macular region, causing marked reduction of the vision.

Greater clinical importance is attached to the so-called senile macular degenerations. The chief complaint of these patients is impaired central vision, and though they are able to get around and carry on their activities, the ability to read and perform the finer visual tasks is considerably diminished. Ophthalmoscopically one sees in the macular regions

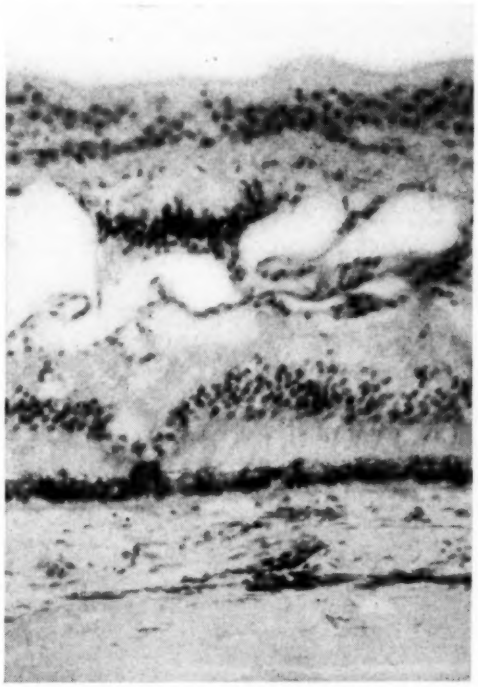

Fig. 16 (Rones). Cystic degeneration of the retina in the macular region.

an irregularity and heaping-up of pigment, with minute and conglomerate whitish patches of drusen and connective tissue. Histologically it is evident in these cases that the obliteration of the chorio-

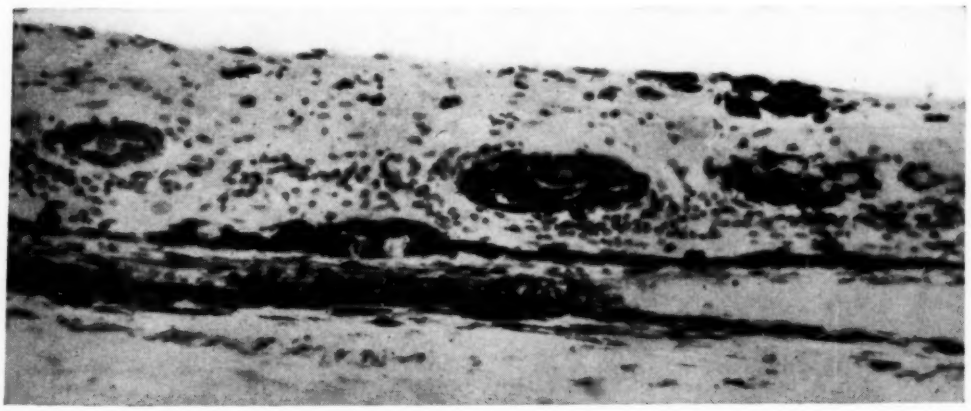

Fig. 17 (Rones). Degeneration of the retina in the macular region.

capillaris is of primary importance in producing the retinal changes, for the deeper layers show considerable disorganization and atrophy (fig. 17). There are also present adjacent areas of atrophy and of proliferation of the pigment

Fig. 18 (Rones). Hyalin degeneration of the media in the retinal arteriole.

epithelium, together with drusen on the lamina vitrea. Many clinical observations have pointed to a relationship between senile macular degeneration and hole formation in the macular region.

Sclerotic changes in the retinal blood vessels have been studied exhaustively, both clinically and pathologically; but the correlation of the evidence produced by these methods of investigation has not been entirely satisfactory. A differentiation can be drawn between arteriosclerosis and arteriolosclerosis, for the two types are quite distinct pathologically. When the arterioles of the body are involved in the diffuse type of hyalinization of the media (fig. 18), there are found as ocular complications a diversity of hemorrhages and exudates, while general bodily resultants are hypertension and cardiac and renal impairment. This type of sclerosis is seen in middle age with greater frequency than in the elderly, and consequently has no relationship to senility. Arteriosclerosis, however, is within the province of this study. Pathologically, the changes occur in the intima of the larger retinal vessels. The intima shows an increase in thickness due to a proliferation of connective and elastic tissue, with a deposition of lipoids (fig. 19). This thickening is usually of a nodular character, so that small plaques project into the lumen of the vessel causing localized constrictions of its caliber. Clinically, this pure type of arteriosclerosis is observed in elderly individuals without any associated hypertension. Friedenwald has described the ophthalmoscopic picture; stating that the larger vessels are of normal caliber, but show beading, irregularity in the light streak, visible walls, and rarely arteriovenous compression, hemorrhages, or exudates. The arterioles are normal in these cases. However some of these elderly people with marked arteriosclerosis, do have an associated hypertension, usually of moderate degree. These differ from the above group in that the larger arteries show a diffuse constriction with fine caliber variations, definite arteriovenous compression, and a disappearance of the reflex stripes. In these cases there is an arteriolosclerosis associated with the arteriosclerosis, and Friedenwald believes that the marked narrowing of the caliber of the larger vessels is due

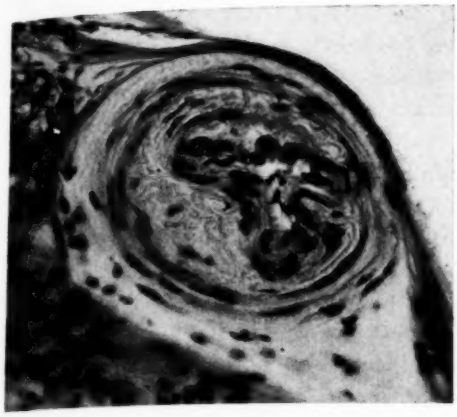

Fig. 19 (Rones). Sclerosis of the central retinal artery on the papilla. The proliferated endothelium has almost occluded the lumen.

to the formation of intimal plaques within the intraneural portion of the central retinal artery, thus allowing only a narrower column of blood to reach the more peripheral retinal vessels.

Optic nerve

As just mentioned, sclerotic changes in the intraneural portion of the central retinal artery are a fairly common finding in the aged. Vascular changes of the same nature can be found in the smaller arteries which nourish the optic nerve, sending their branches into the nerve from the pia-arachnoid sheath. The occlusion of these arteries, either by sclerotic plaques or by thrombi, will cause an infarct with resultant atrophy of wedge-shaped sectors of the nerve. Fuchs has also designated as a senile type of atrophy, a characteristic degeneration of the intracranial portion of the nerve, due probably to the pressure of a sclerosed carotid artery upon this segment, and frequently involving the papillomacular bundle.

With the ophthalmoscope, hyalin or colloid bodies are frequently seen on the optic disc. They may be arranged around the margins, or prefer the central zone, or may cover the entire papilla. In appearance these are brightly illuminated clusters of globular shape, and may at times assume considerable proportions. The majority of cases are bilateral, and their appearance in some instances has been watched over a period of many years, seemingly unassociated with any visual impairment. Microscopically they have also been found within the nerve, just in front of the lamina cribrosa (fig. 20). They are very similar in appearance and chemical reactions to the colloid excrescences of the lamina vitrea. However, the nodules within the nerve do not seem to bear any relationship to the pigment epithelium of the retina, but are thought to arise from the neuroglial tissue. These hyaline bodies can also become calcified, as do those of Bruch's membrane.

Corpora amylacea, which are normally seen in the central nervous system, are frequently found in the optic nerve and sheath of the elderly, when no atrophy of the nerve is present. These are roundish, homogeneous, and highly refractile

Fig. 20 (Rones). Colloid body in the optic nerve.

bodies, which give the characteristic staining reactions of amyloid. They always remain discrete, and often seem to show a definite capsule. Although most commonly seen in the intracranial portion of the nerve, they are at times found in the papilla and even in the nerve-fiber layer of the retina.

Vitreous

A frequent complaint of elderly patients is the appearance of floating spots before the eyes. Examination usually shows large stringy vitreous opacities, moving fairly rapidly with the excursions of the eye. No inflammatory lesions are visible, and the condition does not progress, nor is the visual acuity diminished. It is due to a senile disintegration of the fibrous network of the vitreous, so that this body loses its gel characteristics and becomes more fluid. Pigment granules wander into its anterior portion from the posterior surface of the iris, and are visible with the slitlamp as a fine scattered pigment dust.

In the healthy vitreous one never sees microscopic fat of any kind. However, in the degenerated fibers of the elderly there often occurs a fatty change with the deposition of cholesterin crystals, the so-called synchysis scintillans. These highly refractile particles floating in the vitreous afford a very dramatic ophthalmoscopic spectacle, but the patient is usually entirely unaware of their presence, for they cause no visual disturbance. At other times the floating bodies resemble cotton-balls, these being the calcium soaps of fatty acids.

Lens

The changes that occur in the lens with advancing years are of the greatest clinical importance. It is a structure differing from the other ocular tissues in that its growth is continuous even unto extreme old age. Although new fibers are being constantly formed by the subcapsular epithelium there is only a moderate increase in the size and thickness of the lens. However, this increase in thickness of the lens does contribute to the flattening of the anterior chamber. The process by which the size of the lens is prevented from reaching undue proportions is that of peripheral apposition of new lens fibers and the consequent compression of the older central nucleus. This nuclear sclerosis results from the loss of water and soluble albuminous materials, and consequently the elderly lens has a hard, rubbery consistency. On section no fibers can be differentiated in this homogeneous nucleus. Clinically the loss of elasticity is manifested by a decrease in the amplitude of accommodation. Also this increasing nuclear sclerosis causes the absorption of a part of the visible spectrum, so that instead of being transparent, the aged lens has first a yellowish tinge and then becomes a dark brown. Uneven zones of sclerosis will cause various changes in the refractive state, and this will be further altered by the development of opacities. Autolysis of lens fibers will produce fissures and opacities in the lens.

At the periphery of the lens of old individuals there is often found a ring-shaped opacity which has been called gerontoxon lentis, as an analogy to the gerontoxon corneae, since they are found together so frequently. Because of its peripheral position this cannot be seen ophthalmoscopically. On histologic examination the opacity will be seen to lie in the lens substance, but involves the epithelium and capsule.

The suspensory ligaments of the lens are greatly thickened in old age, and are much less elastic than previously. This is of importance in the selection of cases for performing the intracapsular type of cataract extraction.

Extraocular muscles

The slowly increasing ptosis so often seen in old people is due both to changes in the levator palpebrae muscle and to the decrease of the retrobulbar fat pad producing an enophthalmos. Although the levator shows these senile degenerative changes most frequently, the other external ocular muscles will be found to be similarly involved, this accounting for the various muscular imbalances which occur in this age group.

Microscopically, the increase in the amount of connective tissue between the muscle bundles is striking, especially in the neighborhood of the larger vessels. A considerable accumulation of fat droplets is seen around the blood vessels, and also in their walls, which are considerably thickened. The muscle fibers themselves show considerable variation in size, with an increased translucency of their surrounding membrane. The sarcoplasm shows an irregular granular consistency, and the nuclei are of various sizes and surrounded by considerable amounts of fat droplets.

The tendinous insertions of the muscles also are altered. In the young, these consist of closely packed bundles of connective-tissure fibers containing the so-called tendon cells, with elongated nuclei arranged parallel to the fibers. In old age, however, the tendon fibers are much more loosely arranged, and the tendon cells now cross the fibers in various directions. Accumulations of fat droplets are also found around the nuclei.

Summary

Analyzing the factors contributing to the diversity of senile changes in the ocular tissues leads to the conclusion that the vascular changes are of fundamental importance. Impaired nutrition resulting from this will explain the deposition of fat globules in the various structures. It is also well known that initial proliferative changes leading to subsequent degenerations are attributable to faulty circulation. The old adage that "a man is as old as his arteries" can thus be also applicable to the changes that occur in the eye during advancing years.

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POSTERIOR SCLEROTOMY AS A FORM OF TREATMENT IN SUBCHOROIDAL EXPULSIVE HEMORRHAGE*

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The fortunately rare but disastrous complication of subchoroidal hemorrhage which may follow any penetrating wound of the eyeball, surgical or other, is the *bête noire* of the ophthalmic surgeon. It is a catastrophe that cannot be foreseen, and probably not prevented, although several forms of preventative treatment have been advocated. Ziegler,[1] for example, recommended reducing the arterial tension by the use of sodium nitrite and venesection, also the orbital injection of novocaine and adrenalin just prior to the operation and a hypodermic injection of 0.5 dram of ernutin, 10 minims of pituitrin, and 10 minims of adrenalin, three times on the day prior to the operation. Ziegler summarized the etiologic factors involved as: (1) arteriosclerotic changes, either local or general; (2) sudden lowering of the intraocular tension through decompression of the globe; (3) traumatic detachment of the choroid through surgery, contusion, or strain; (4) disturbance of the sympathetic nervous system through emotional shock, and (5) a hemophilic tendency.

Samuels,[2] whose excellent study needs emphasis, is certain that the blood comes from a rupture of one of the two long posterior ciliary arteries, and believes that the seat of the rupture is at the site of the entrance of the artery into the perichoroidal space. As the streaming blood drives the choroid forward, other blood vessels at the anterior and posterior aspects of the perichoroidal space may be torn by traction.

If the hemorrhage ceases and remains confined to the perichoroidal space, some vision may be preserved, and the ophthalmoscopic condition is presented which Meller[3] has called pseudosarcoma of the choroid. Samuels states: "It is well to bear in mind the possibility of the existence of such areas in the anterior stretches of the fundi of eyes that have been injured or operated upon."

If the bleeding continues, the choroid is ruptured, and the blood, in flowing out of the opening in the globe, carries with it most of the intraocular contents.

Expulsive hemorrhage is ushered in by a sharp agonizing pain in the eye, accompanied by what Ziegler described as "convulsive or ague-like trembling" of the whole body, associated with a rapid pulse and cold, clammy perspiration. It is, indeed, a mild form of surgical shock. Nausea and vomiting sometimes precede the hemorrhage and at other times follow it.

Treatment of the actual hemorrhage has been generally limited to the injection of morphine, adrenalin, ergot, and pituitrin; placing firm pressure over the eye and the homalateral carotid artery; and causing the patient to sit with legs hanging over the table, in order to drain as much blood away from the head as possible (Jackson[4]).

In 1915 F. H. Verhoeff[5] reported the case of a man, aged 60 years, with bilateral chronic noninflammatory glaucoma. A sclerotomy with a large button-hole iridectomy was performed on the right eye. The operation proceeded without difficulty to the point of inserting the conjunctival sutures, when the vitreous suddenly began to pour out from the wound. The eye became extremely hard,

* Read before the American Ophthalmological Society, at Hot Springs, Virginia, June, 1937.

and there was severe pain. Four hours later Verhoeff believed that he could let out the blood by sclerotomy puncture to relieve the glaucoma. The first puncture with a Graefe knife was made on the nasal side, and only a small amount of blood escaped. A second puncture was made on the outer side, and from this a large quantity of blood flowed out and the eye partly collapsed. As soon as the knife was removed the eye filled up again. A third puncture was then made below the second, with exactly the same results. The procedure was then regarded as useless, and the patient was returned to his bed.

During the night of the following day the pain became more severe and a considerable amount of blood flowed from the eye, so that the bandage required changing. The convalescence from then on was more or less uneventful. Three weeks after operation the vision was 20/200.

Bernard Samuels, in 1931, described eight cases of glaucoma in which the eyes had been removed because of pain, blindness, iridocyclitis, or high intraocular tension following some surgical procedure for the relief of the original glaucoma. Pathologic examination revealed nonexpulsive subchoroidal hemorrhage of greater or less extent.

He says "The amount of blood may be just enough to cause a low circumscribed detachment of the uvea far forward, or it may be so large as to undermine the uveal tract on one side, from the scleral roll anteriorly to the margin of the optic nerve. Usually the blood does not undermine beyond the limits of the perichoroidal space. As this comes to an end posteriorly at a considerable distance from the nerve head, it is exceptional to find blood under the choroid in the posterior segment of the eye. The vortex veins superiorly and inferiorly fix the choroid to the sclera, in the region of the equator. For this reason the blood accumulates on the nasal or temporal side, where there is nothing to prevent the choroid from detaching itself from the sclera." From a study of his specimens he concludes that the bleeding is more apt to break out on the temporal side first and to be present there in greater amount. For this reason sclerotomy should be performed first on the temporal side, then on the nasal. Samuels also points out that sclerotomy could be performed even after the blood has remained in the perichoroidal space for some days, because the blood may continue unchanged for an indefinite period and the encapsulation may be long delayed.

Two cases that support Verhoeff's and Samuels's contentions, and indicate that prompt action may result in saving something out of what would otherwise be an ophthalmic wreck, are here reported:

Case 1. A white woman, aged 41 years, was first seen by me on December 19, 1927. One year previously a cataract extraction had been performed on the left eye, with a resultant secondary membrane. The right eye contained a mature cataract. Intraocular tension was 22 (Schiötz). In November, 1928, cataract extraction was performed. The lens was dislocated with forceps and expressed. On delivery of the lens the capsule ruptured, but was recovered with forceps. The immediate result was excellent, although the wound appeared to bulge a trifle. At intervals during the night, the patient retched and vomited, although she did not complain of ocular pain. On the following morning, while the dressing was in progress, she complained of severe ocular pain and nausea, and presented the typical appearance of a patient with expulsive hemorrhage. The wound began to gape, and vitreous appeared within its edges. A Graefe knife was plunged

radially into the upper temporal side of the eyeball, about 14 mm. from the limbus, and the blade was twisted. Bright blood appeared instantly and continued until at least 14 or 16 pledgets of cotton had become soaked. The pain gradually subsided, and with its subsidence the knife was withdrawn. In the meantime the entire wound was bulging and gaping, and in addition to vitreous, blood and iris appeared. A pressure bandage was applied, morphine was administered, and the head was fixed between sandbags. The patient had no further pain. For the next few days the eye showed no change except that there was marked conjunctival chemosis and swelling of the lids, which gradually subsided. On November 21st, 11 days after the subchoroidal hemorrhage, the wound was reopened and blood clot, coagulated and fibrinized vitreous, and entangled iris tissue was excised. The cornea was sutured to the sclera.

The eye healed, and on December 11, 1928, the patient was discharged from the hospital. The wound had flattened and was healing, and there was a slight iris prolapse on the nasal side. Due to organized blood clot and membrane in the pupil area, no red reflex could be obtained.

On January 3, 1929, an iridotomy and incision of a heavy white pupillary membrane was performed. The red reflex was remarkably good. There were many strings of flocculent vitreous opacities, especially in the floor. The optic nerve head was normal. On the temporal side, extending from near the macula toward the extreme upper periphery, a heavy white streak, such as is so frequently seen in ruptures of the choroid was observable. This streak was irregular, but sharply outlined. The vision with +9:50 D. sph. ⊂⊃ +6:00 D. cyl. ax. 105° was 20/50. The vision was distorted, probably owing to edema of the macular area. Six months later the eye was found to be free of congestion, the vitreous was clearer, and the temporal white streak was irregularly pigmented. Intraocular tension was normal. Vision with +10:00 D. sph. ⊂⊃ +3:00 D. cyl. ax. 170° was 20/30+; with a +3:25 D. sph. added J. 2 was read slowly. The peripheral field of vision was normal. There was, however, a small relative central scotoma.

On April 8, 1930, at the time of the last examination, the right vision with correction was 20/25—. The relative central scotoma was still present and the vitreous had become clearer. She died in 1932 as a result of a uterine neoplasm.

Case 2. A white woman, aged 65 years, had been under observation since March 23, 1931, for chronic noninflammatory glaucoma of the right eye. At the time of the first examination the intraocular tension was elevated to 35 mm. Hg (Schiötz), and the field of vision was reduced to a 10-degree area between the fixation point and the nerve head, with a nasal step extending out to 5 degrees on the nasal side. Her corrected vision was 20/25. The left eye was entirely normal. The intraocular tension was well controlled with miotics until September 5, 1934, when it was found to be 38 mm. Hg (Schiötz). It fluctuated from 30 to 38 mm. Hg (Schiötz) until April 5, 1935, when an iridectomy was attempted with a Graefe knife. A preoperative retrobulbar injection of 2-percent novocaine with adrenalin did not lower the intraocular tension to any appreciable extent. Immediately upon completing the incision the patient complained of severe ocular pain, and showed the characteristic beginning of an expulsive hemorrhage, sweating, and collapse. The iris and vitreous prolapsed between the lips of the wound. The Graefe knife was plunged into the temporal side of the eyeball, just

above the edge of the external rectus, about 14 mm. from the limbus, and the blade was twisted. Bright blood flowed for about two minutes, during which time the knife was held in place. The pain grew less, although it was still severe. The prolapsed iris and vitreous, the latter thick and mucoid, were excised. However, vitreous continued to form at the site of the wound and treatment was halted. A pressure bandage was applied and morphine administered. Convalescence proceeded smoothly. After the vitreous bead had receded the wound edges approximated. The patient was discharged 18 days later. The red reflex was bright, except for many stringlike floating opacities in the vitreous. The optic nerve head showed the same degree of atrophy and cupping as before the operation. On the temporal side, beginning near the equator and running upward as far as could be seen, there was an irregular white streak in the choroid. The intraocular tension was 20 mm. Hg (Schiötz).

One month later the vision was 20/200, and this was considered due to further encroachment on the field of vision. The eye was white and quiet.

Conclusions

In threatened expulsive subchoroidal hemorrhage following operation there is everything to gain and nothing to lose by performing a sclerotomy. To Verhoeff is due the credit for being the first to save such an eye, and to Samuels for explaining the *modus operandi*. Verhoeff records that in another case he would advise stopping the vitreous flow by making digital pressure, and puncturing the sclera as rapidly as possible. He suggests that small, triangular incisions be made, excising the apex of the triangle to afford continuous exit to the blood.

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Discussion

Dr. Bernard Samuels, New York: Dr. Vail has requested me to examine three of his lantern slides in a discussion of his paper.

The first slide represents a typical nonexpulsive subchoroidal hemorrhage. The difference between this type and the ordinary expulsive hemorrhage consists in the fact that in the nonexpulsive hemorrhage there is no rupture in the choroid, but in the expulsive hemorrhage, in which the eye is always lost, the choroid ruptures and almost the entire contents are extruded. The nonexpulsive hemorrhages are nearly always more marked on the temporal side. The retina is never detached, because the retina and choroid are pressed together against the vitreous. These subchoroidal hemorrhages take place far forward, and posteriorly they

seldom reach to the margin of the optic nerve, leaving a considerable zone surrounding the optic nerve.

The second slide is that of a glaucomatous eye in the horizontal meridian. The eye was not removed until ten days after an iridectomy. Nonexpulsive hemorrhages do not always occur just at the time of the operation, but may take place a number of hours afterward. In this respect they differ from the ordinary serous choroidal detachments described by Dr. O'Brien before this Society. A serous detachment occurs slowly, because transudate takes a much longer time to accumulate than a hemorrhage does. In serous detachment the globe is soft, whereas in nonexpulsive subchoroidal hemorrhage the blood accumulates rapidly. In these latter cases the eyeball is hard.

The third globe is cut in the vertical meridian, taking in the site of a trephine operation. At the end of the operation the vitreous presented itself in the wound. The eye was not enucleated until some days later. The blood in the subchoroidal space is remarkable because it is so well preserved. It shows how difficult it is for the choroid to become detached in the neighborhood of the vortex veins. The hemorrhage is the result of a rupture in one or both of the long posterior ciliary arteries. Most of the ruptures of the blood vessels seem to occur on the temporal side, and it is on this side that there is the greatest accumulation of blood.

According to laboratory experience, nonexpulsive subchoroidal hemorrhage occurs more frequently after the trephine and the Lagrange operations than after simple iridectomies. The explanation is that after these operations the globes remain soft for a long time. Whereas the diseased blood vessels might withstand a reduction in tension for a short period, they would be more likely to rupture if the reduced tension continued over a prolonged period.

GENERAL CONSIDERATIONS IN THE RADIATION TREATMENT OF SKIN CANCER IN THE REGION OF THE EYE*

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The purpose in presenting the following report is to discuss very briefly some of the technical factors to be considered in the irradiation treatment of skin cancer in the immediate vicinity of the eye. Inasmuch as there is a wide variance in the armamentarium available to individual therapists, several types will be considered.

Probably one of the oldest methods, and one commonly used on the Continent for skin cancer, is the radon or radium plaque. Radium in this applicator is filtered through approximately three millimeters of brass, and is usually applied at a distance of one centimeter from the skin surface. The intervening distance is maintained by balsa wood of this thickness. Such a plaque gives a depth dose of approximately 30 percent at one centimeter in the tissue. The skin surrounding the lesion is protected by a 2 to 3 mm. lead shield. The entire unit is held in place with adhesive tape.

There are more than theoretical objections to the use of plaques for treatment about the orbit. The duration of application, depending upon the amount of radium or radon available, varies between 1 and 20 hours. The difficulty in accurate application to convoluted surfaces is apparent. The eye cannot be absolutely protected. It is well known that one centimeter of lead removes but 50 percent of the gamma rays. Figure 1 shows the cal-

*From the Head and Neck Department, Memorial Hospital, Service of Dr. Hayes E. Martin.

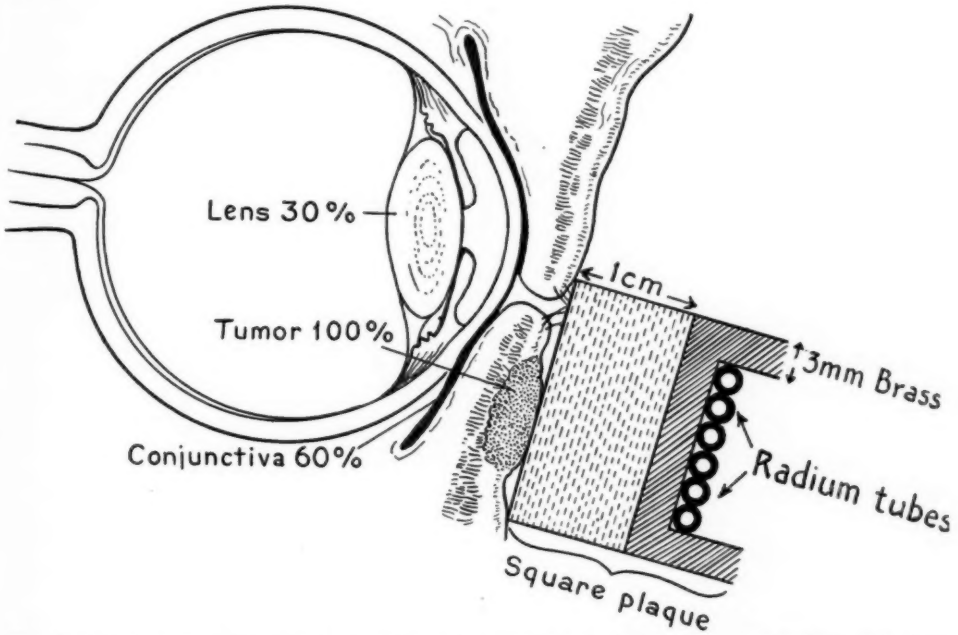

Fig. 1 (Watson and Wuester). Showing the percentage depth dose received by the deep structures of the eye when a cancer of the eyelid is treated by one of the usual radium plaques filtered by 3 mm. of brass at a distance of 1 cm.

culated percentage depth dose received by various structures of the eye with this form of treatment.

The gold radon seed, 4.0 x 0.75 mm. in size, is widely used interstitially for small skin lesions. Figure 2 shows the advantage of the gold seed over the plaque. The seeds, being small, are inserted with the minimum amount of trauma. They are

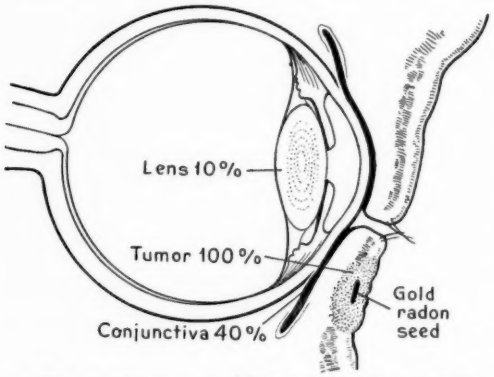

Fig. 2 (Watson and Wuester). Showing the advantages of the gold-radon-seed method of treatment, which reduces the depth dose received by the lens to 10 percent.

considered permanent implants, although in some cases in which the lesion is very superficial, they may be extruded several weeks after insertion. It is not possible for the patient to wear an adequate eye shield for the duration of activity of the radon implant. Furthermore, since the gold seed has 0.3 millimeter gold filtration, 91.2 percent of the irradiation is gamma, 8.8 percent beta, the latter being almost completely absorbed in the first half centimeter of tissue. Therefore, lead, in the thickness that would be required, offers incomplete protection from the gamma rays.

In using radium-element-eyed needles, size is an objectionable factor. The needles most commonly used have been the 17-mm. Treves and the 11-mm. Martin needle. The objection to size has been partially overcome by the 7 × 1 mm. removable radium-element seeds recently introduced into this country.

The irradiation of normal tissue in close proximity or contiguity cannot be avoided, especially if the lesion is small and only large needles are available. The same objections pertaining to the gold radon seed hold true here, plus the added trauma incident to the insertion of these larger needles.

The use of the moulage of either dental modeling compound or wax, which holds the radium or radon tubes or seeds in direct contact with the lesion, has a limited but definite use. This type of therapy must of necessity be limited to very superficial lesions of not more than 1 to 2 millimeters in thickness. Its use has practically the same restrictions as has the gold radon seed.

A good deal of clinical evidence is available to support the opinion that no one method has so many advantages and so few disadvantages as a single massive dose of lightly filtered low voltage X ray. Using 100 KV., 25-30 cm. target skin distance and 0.3 millimeters aluminum filtration, one millimeter lead removes over 99.5 percent of the radiation. With a 10 × 10 cm. field, the depth dose with unfiltered radiation is approximately 70 percent at one centimeter.

The irradiated area should be restricted to the cancer-bearing area by means of a lead shield, one millimeter in thickness, which will completely protect the surrounding normal skin. Instead of an open port, the X-ray beam is limited by a cylinder chosen both to maintain the target skin distance and to keep the lead shield and patient in a set position. One must remember that diminishing the size of the irradiated field decreases both the surface and depth dose. Correspondingly higher "r" dosages must be given to the smaller fields.

If any portion of the beam is directed toward the eye, these structures may be protected by an oval, curved, lead eye

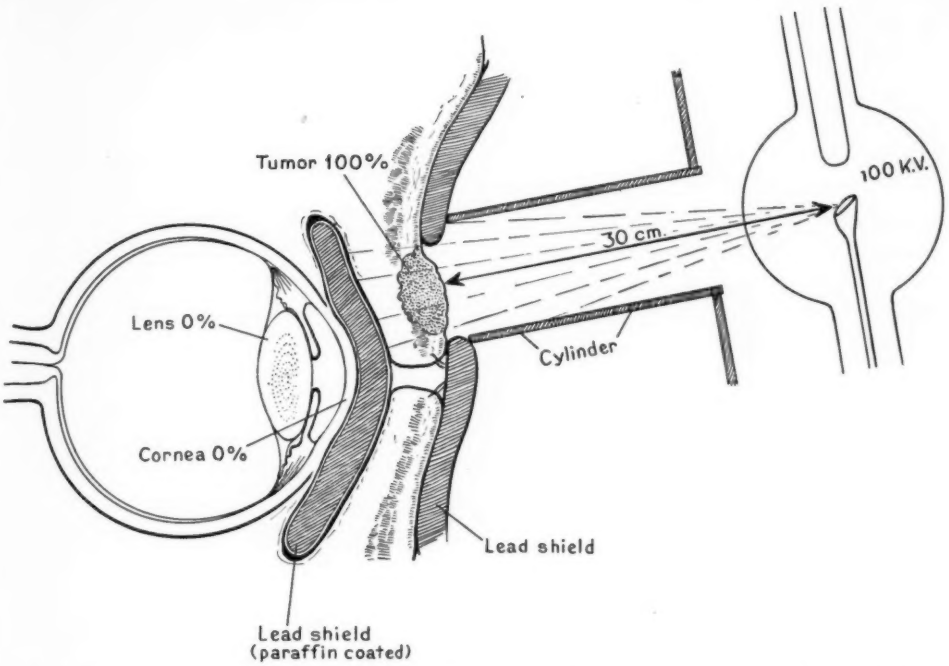

Fig. 3 (Watson and Wuester). Showing the present method of treatment by low-voltage, unfiltered X ray. The tumor receives 100 percent and the lens and cornea are completely protected from harmful effects of the rays.

shield, one millimeter in thickness, coated with paraffin to remove the secondary radiation and offer a less abrasive surface to the cornea (fig. 3). This shield is inserted under the lids under topical anesthesia. By this means lesions of the eyelids may be treated without fear of secondary changes in the lens or cornea.

From an economic standpoint, the lower cost of therapy, the ease of application, and the short duration of the treatment time, all commend themselves.

Summary

1. Various considerations in regard to the treatment of skin cancer in the region of the eye are discussed. Low-voltage X ray is the means of choice, advocated for its efficiency and for the safety factors and economic considerations offered.

2. No dosage factors are given, for each case presents its own specific problem of management.

1088 Park Avenue.

CAUSES OF SENILE CATARACT*

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Denver

The crystalline lens is the supplementary and adjustable part of the optical apparatus of the eye. The power of accommodation allows the eye to focus rays of different degrees of divergence. The lens astigmatism tends to correct the corneal astigmatism. During adult life the lens increases in size, and the higher index of refraction of the nucleus tends to correct the spherical aberration of the eye, and the aberration of oblique rays. These variations in the lens, which may be classed as normal, continue until old age. The statistics of Priestley Smith, based upon the findings in 1,000 eyes, showed that the lens increased in bulk and weight, one third between the ages of 25 and 65 years.

Light penetrates freely most of the soft tissues of the body, but only the refractive media of the eye are fully transparent. These media are composed of, or secreted by, epiblastic cells that take part in the development of the eye. They are enclosed by glass membranes—membranes of invisible structure. These include Bowman's membrane, the membrane of Descemet for the cornea, the capsule for the crystalline lens; and Bruch's membrane, between the choroid and the retina. These membranes control and filter the nutritive fluids that gain entrance to the refractive media. A break in any one of them gives rise to opacity of the adjoining transparent medium. Thus, a puncture in the capsule causes the adjoining lens substance to become opaque—a form of traumatic cataract. If the break is small and is quickly closed, some clearing of the lens substance takes place and sometimes complete transparency may be regained.

It must also be recognized that, without any visible damage to the lens capsule, this may be so altered that substances that impair its transparency gain entrance to the lens. This seems to be the obvious cause of diabetic, lamellar, and tetany cataracts. It may also be a cause of senile cataract, and such changes may often vary with age. We know little of the qualities of glass membranes, or of the normal nutrition of the crystalline lens. We have only a sort of underpinning of speculation, instead of any foundation of scientific fact, for our philosophy. Now that biochemistry has become an expanding branch of medical science, and "glass membranes" can be made artificially out of organic materials, such as collodion and cellophane, we may hope that the scientific significance of the transparency of the crystalline lens, and experimental evidence as to the causation of cataract, may be forthcoming.

At least it is worth while, at this time, to assemble and arrange the facts empirically observed regarding the causation of cataract. These have all been confirmed, or observed, since Thomas Young began his observations on the crystalline lens, which he called the "musculus crystalinus." He saw and announced that the crystalline lens furnished the power of accommodation, adapting the eye to the focusing of rays of varying degrees of divergence. He regarded the lens as a muscle having the inherent power of changing its shape. When Bowman and others had studied the histology, behavior, and nerve supply of voluntary striated muscles and of unstriated muscle fibers, it became obvious

* Read before the American Ophthalmological Society at Hot Springs, Virginia, in June, 1937.

that the crystalline lens was quite different from these, and an entirely different explanation of its changes of shape, by elasticity and external pressure, had to be devised.

The explanation of Helmholtz, applied to the practically uniform jellylike lens of the infant, seemed to be a satisfactory one. Apparently, however, Helmholtz did not know that each lens fiber developed from an independent cell, and that it was a part of the life of such cells that they grew more hornlike with age; and that the increasing index of refraction was a characteristic of the life of each of these cells. The nucleus of each cell persists; although, when scattered through the bulk of the lens, they failed to attract the attention of the early histologists. The power of growth and cell repair remains through a considerable portion of early life. The writer has seen a boy of six years in whom complete recovery of transparency occurred within a few weeks after a needle had been thrust entirely through the dislocated lens, piercing both the anterior and the posterior capsule. Randolph, in his experiments on young rabbits, found a common formation of a ring of clear lens from the equatorial epithelial cells.

Cataract extractions constitute an autopsy of the lens. In not more than six of 300 of these was absence of a firm nucleus found. The rigidity of the nucleus varies greatly, but it is almost always noticeable after the age of forty. In some of the sclerosed lenses the shape of the nucleus is no more changed by pressure than the shape of a cherry-stone is altered by pressure on the outside of the cherry.

Helmholtz may have been correct as to the infant lens, if he believed that all parts of the jellylike mass could participate in the movements required for change of shape in the lens in accommodation. But every lens extracted for senile cataract shows division into a nucleus incapable of change in shape by any force that the eye can apply to it; and the cortex, in which the changes of shape necessary to accommodation are possible.

Study of the lens by slitlamp microscopy has revealed, in nearly all cases, what are called zones of discontinuity, or disjunction. These are zones of comparative haze, or opacity, separating layers of lens substance that are more perfectly transparent. These zones vary from one, marking off the fetal nucleus, to three or four, visible in older eyes. These zones have been observed by all workers in biomicroscopy, and it is generally believed that each zone marks a period of disturbed nutrition, as at birth, during puberty, in adolescence, or during some period of illness. They resemble the more serious opacities known collectively as lamellar cataract.

Scientific knowledge of the causes of cataract might be said to begin with the observations of Meyerhöfer,* under the title of "Cataract in glassworkers." Among 506 workers examined, this observer found that 59 had some opacity of the lens. To explain this frequency of cataract he suggested two things: exposure to intense radiant heat and copious loss of fluid perspiration. He found that the left eye was more exposed to heat, and more frequently the seat of cataract. He describes one patient who waited five years for his cataract to mature for operation and who was attacked by pleuropneumonia. During recovery he was subject to excessive perspiration, and then found that both of his cataracts were ripe for extraction. Since that time other observers have reported the development of cataract in glass workers, and numerous cases of cataract following repeated ex-

* Meyerhöfer: Klin. M. f. Augenh., February, 1886; Ophth. Rev., April, 1886.

posure to roentgen rays have been reported. The experimental work of Verhoeff and Bell, entitled "The effects of exposure to light and heat," has been published.

It is interesting to note that dinitrophenol, which has so recently been shown to be an important cause of cataract, acts as a reducing agent, by greatly diminishing the amount of water in the body tissues. In an attempt to sustain the general health of elderly persons with partial cataracts, I have found that the insufficient drinking of water is a very common cause of trouble. Elderly persons who, as a rule, do not take enough exercise, are therefore not prompted by thirst to drink water so frequently or in sufficient amounts. Thus they very often do not take enough water to maintain the normal elimination of waste products from the body. In such patients the daily ingestion of water in large amounts has seemed to check the development of lenticular opacities. A striking instance of this kind may be cited here:

A widow, aged 57 years, required glasses for distance: R.E. +1.25 D. sph. ⊂ —0.75 D. cyl. ax. 155° = 1.0; L.E. +1.25 D. sph. ⊂ —0.75 D. cyl. ax. 10° = 0.8.

At the age of 63 it was noted that she had incipient cataract, dots of subcortical opacity, with corrected vision R.E., 1.0. L.E., 0.8. At 67 she complained that she could not see plainly in a strong light, and could not recognize faces. With correcting lenses: R.E. +1.75 D. sph. ⊂ —0.75 D. cyl. ax. 135° = 0.5; L.E. +2.00 D. sph. ⊂ —1.00 D. cyl. ax. 45° = 0.35.

There was general haziness of both lenses. The patient was told that a cataract was present, that it was progressing, and that she would probably require an operation; but that by drinking water more freely she might retard its progress. Acting on this suggestion she arranged a daily program of water drinking, imbibing it freely at meals, and drinking from four to six glasses between meals. When she reached 68 her vision with the same correcting glasses was: R.E., 0.6; L.E., 0.4+.

She reached the age of 94, and her vision in that year, as compared with my own in the same light, was full 0.6. This patient was never a great reader or needlewoman. After 70 she gave up reading and did nothing that required much effort of the eyes.

Perhaps the most important cause of cataract is eyestrain, and especially the strain of accommodation. It has been the belief that before the age when senile cataract appears, accommodation has ceased or has become unimportant. Of late years, however, many persons who have reached the age at which senile cataract appears are found to have a considerable power of accommodation. The forced adjustment of the crystalline lens to secure the best vision may well be the most disturbing and dangerous cause of impaired nutrition of the lens fibers, whether these change shape only through elasticity in obedience to external force, or whether, as Thomas Young believed, they are a special, transparent form of involuntary muscle cells.

The changes in the form of the lens necessary to accommodation are possible in some eyes up to 60, 70 and even 80 years of age. My own eyes, at 81, show a power of accommodation of nearly or quite 0.75 D., certainly over 0.50 D. I have seen 2 other men who showed 0.50 D. of accommodation at the age of 80. Among 100 patients who reached or passed 60 years of age, 63 were seen at the age of 60, or before 65. Of these, accommodation had been noted in 31. In 4 it was 0.25 D.; in 18 it was 0.50 D.; in 3 it was 0.75 D.; in 3 it was 1 D., and in 1 it was 1.25 D. Among the many patients who have reached the age of 60 I am sure I have seen 2 who had an accommodation of 1.50 D. Neither was included in the present series. Of these 100 patients, 31 were seen at or within 5 years of the age of 70. Among these were 5 who had an accommodation of 0.50 D., and 1 who had an accommodation of 0.75 D. Among the 12 who were seen at or near the age of 80 were 3 who had an accommodation of 0.50 D. Among the eyes with an ac-

commodation of 0.50 D. after 80, all had lenses that were relatively clear, giving good useful vision. In 3 patients who had 0.50 D. of accommodation after 80 all had clear media. The possession of useful accommodation, up through the age when senile cataract usually occurs, is not rare.

When the crystalline lens has a rigid nucleus and a soft cortex, the change in its shape required for accommodation—of even 1 D.—must strongly dispose to serious impairment of the nutrition of the lens fibers. We have all seen cases of cataract that advanced rapidly during periods of nerve strain. Such strains may impair the nutrition of the body in general; but there are also periods during which eyestrain is liable to be severe, and that will remain unnoticed until failure of vision commands attention. When an eye that is undergoing rapid increase of lens opacity is carefully observed with the biomicroscope, the light-slit affords very favorable conditions to observe the changes, even in single lens fibers. Under these circumstances, as the fibers become partly opaque it is possible to see them change shape under the stress of accommodative effort; and it is difficult to avoid the impression that they are taking an active part in the change of the lens form. The arrangement of the fibers, starting from the anterior Y, and passing around the mass of lens substance to be attached to the posterior Y, is the best mechanical arrangement conceivable for contracting the equatorial circumference of the lens and forcing the lens substance toward the poles, in order to increase its refractive power. Whether or not the accommodative changes in the shape of the lens are brought about by external force, some pressure must be exerted to produce them. It is hard to watch these embracing, interwoven fibers changing shape, without feeling that they may be the active agents. Probably the role they play in the causation of cataract will be determined largely by biomicroscopy.

This is a field of investigation worthy of attention. Young's supposition that the lens was a muscle has been ignored, rather than disproved. Fincham has pointed out that the rigidity or elasticity of the lens capsule may be an important factor in determining the form of the lens. There is no evidence that either Helmholtz or Gullstrand has given adequate attention to the possibilities of such factors. The theory that lens fibers may respond to stimulation by pressure, as do the unstriated muscle cells of the intestine, has not been investigated. The mechanism of accommodation needs to be examined with biomicroscopy, and then it may be found to have a very important share in the causation of cataract.

Republic Building.

Discussion

Dr. C. A. Clapp, Baltimore: I would like to ask Dr. Jackson one question. If the loss of water is the cause of the lenticular opacities, why is it that such persons as boiler inspectors, who are subject to high temperatures and who lose a large amount of water by perspiration, but who are not exposed to light rays, do not develop cataract?

Dr. Edward Jackson, closing: With reference to Dr. Clapp's question, I would say that is a subject for further investigation. The striking connection in the loss of body fluid through the use of dinitrophenol as a reducing medicine (and we now have quite a good many, probably over 100 instances of cataract in relatively young people, coming on not at the beginning of such treatment, but sometimes after the treatment has ceased) offers an opportunity for the experimental study of the nutrition of the lens, which I hope

someone will embrace.

With reference to the matter of loss of perspiration and exposure to radiant energy, I feel that there are not now enough facts before us, to let us come to any conclusions. Drs. Bell and Verhoeff did a valuable piece of experimental work on the effects of radiant energy on the different tissues of the eye. The bulk of their experiments seemed to point to other radiations converted into heat as being active in producing damage to the retina; and, of course, both light and heat rays are concentrated in the macula. This may have something to do with failure to recover from macular lesions. Another thing which was not mentioned this morning is that the macula is a recent development evolutionally, and therefore is presumably liable to damage from many causes. It may be that cataracts represent the deviations from normal nutrition, in relatively recent structures. The human crystalline lens is very definitely a more highly elaborated organ than is the lens in any of the near lower mammals; and entirely different from what the invertebrate animals have.

AN EFFECTIVE OPERATION FOR ENTROPION IN TRACHOMA

F. HARBERT, M.D.
Philadelphia

During my recent 21-month tour of duty in American Samoa, many cases of trachoma and its sequelae were treated. Entropion was common, and the operation described below was performed in 30 cases, with good cosmetic and functional results (figs. 1-4). This operation is based on the idea of transplanting the entire ciliary margin to a higher level by everting the lid margin after a partial tarsectomy, thus creating a new lid margin.

The eye was first anesthetized by instilling three drops of 4-percent cocaine into the conjunctival sac, followed by infiltration of the palpebral conjunctiva and skin overlying the tarsus of the upper lid with a 2-percent solution of procaine containing about one-eighth part adrenalin. This quantity of adrenalin produced a bloodless field and no systemic reactions. The conjunctiva was injected first at three or more points, especially at sites where it was thinned by scar tissue, in order to facilitate dissection by lifting the conjunctiva. Only a small amount, about 2 c.c., should be injected into the cutaneous side to permit easy eversion of the lid.

The upper lid was everted and main-

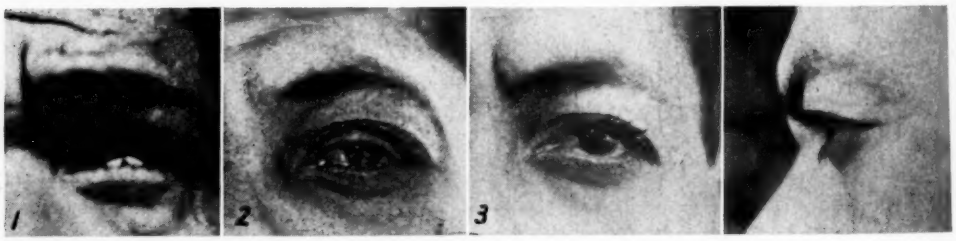

Fig. 1 (Harbert). Trachomatous entropion before operation.
Fig. 2 (Harbert). Condition one week after operation, showing overcorrection and wavy lid margin.
Fig. 3 (Harbert). Condition six months after operation; front view.
Fig. 4 (Harbert). Six months after operation; side view.

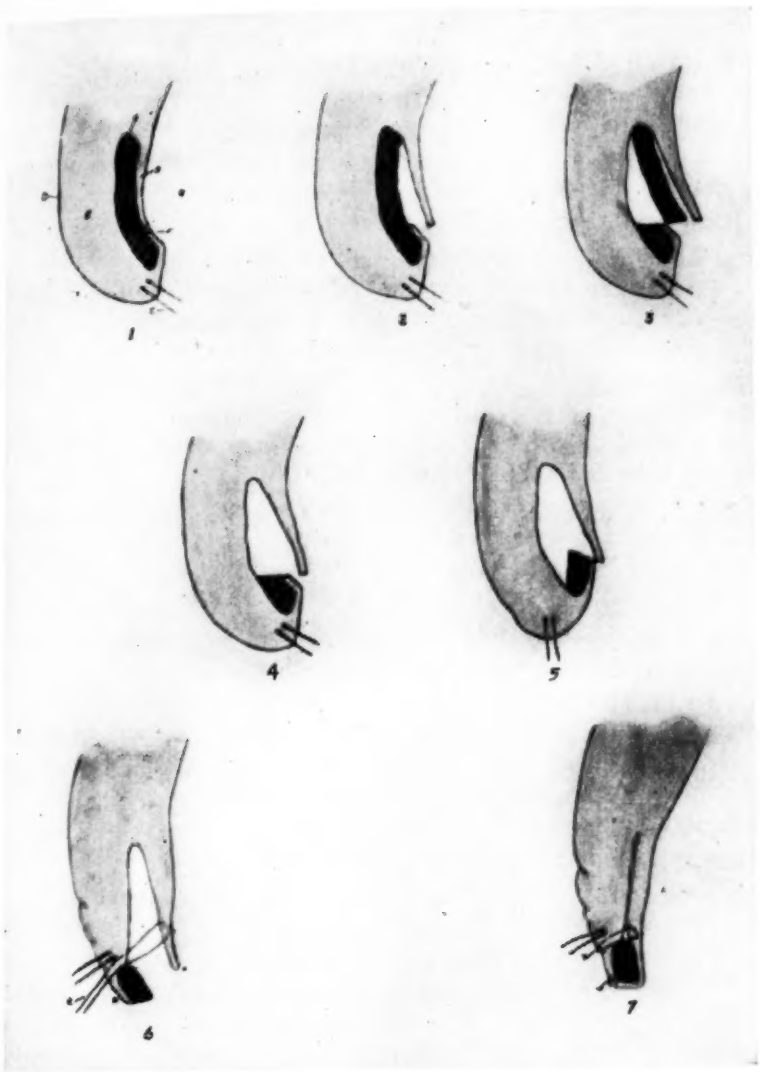

Fig. 5 (Harbert). Schematic drawing showing the steps in the operation: 1.—a, tarsus; b, conjunctiva; c, cilia; d, skin; e, pretarsal tissues; e, conjunctival incision 3-4 mm. from, and parallel to, lid margin, passing through conjunctiva and underlying tissues.

2. Conjunctiva dissected from tarsus. 3. Tarsus freed from pretarsal tissues. 4. Tarsus excised except for small strip attached to lid margin. 5. Attachments of cartilaginous strip to pretarsal tissues freed to middle of distal end. 6.—a, lid margin everted, causing proximal end of cartilage to become the distal end; b, three mattress sutures passed through conjunctiva 5 mm. from free edge and out through skin just below ciliary margin. 7.—a, mattress sutures tied, closing space between the conjunctiva and pretarsal tissues; b, conjunctival edges usually fall together but if they gape they may be approximated by interrupted sutures.

tained in this position by the fingers of either the operator or his assistant. Hooks, threads, plates, and other means were found to be unsatisfactory for maintaining the position of the lid during operation, and to be unnecessary if the patient looked well downward. The initial incision (fig. 5), which passed through conjunctiva and tarsus at the same time, was made parallel to, and two to four millimeters from, the lid margin. A somewhat better effect cosmetically was obtained if the incision was so curved that the distance from the lid margin to the line of incision was slightly greater in the middle and less near the canthi. A small Bard Parker knife with a sharp triangular blade was found to be most satisfactory for this incision. It was also important to make the incision symmetrically and at just the right distance from the lid margin because subsequent trimming was found to be unsatisfactory. The exact distance varied with the degree of entropion and trichiasis as well as with the condition of the tarsus. If the tarsus was considerably thickened, a greater overcorrection was found to be desirable, for greater shrinkage occurred after operation. A tarsus which already consisted largely of dense fibrous tissue would, of course, shrink less, and the incision could be made nearer the lid margin. It was found important to leave enough tarsus in the lid margin to give it form and shape even after shrinkage, which always occurred.

The conjunctiva above the incision was next carefully dissected from the underlying proximal portion of the tarsus. A frequent finding was Arlt's line, a well-marked line or band of scar tissue parallel to, and about six millimeters from, the lid margin. When this was present, dissection of the conjunctiva was very difficult, and it was found best to make another incision in the conjunctiva parallel to the original incision on the proximal side of the scar-tissue band. In this way dissection was facilitated, and only the narrow portion of conjunctiva between the two incisions was lost. The attachments of the tarsus on the cutaneous side were usually easily separated. If considerable difficulty in dissecting the conjunctiva was encountered, the tarsal attachments on the cutaneous side were freed up to and including the proximal edge of the tarsus. The conjunctival attachments of the tarsus were found to be much looser near this proximal margin, and a line of cleavage was easier to find. By proceeding from the proximal tarsal edge toward the line of incision, it was often found easier to separate the conjunctiva from its tarsal attachments.

After the proximal portion of the tarsus had been removed, the lid margin with its attached cartilaginous strip was folded upon itself, and the attachments of the cartilage on its cutaneous side were freed by insinuating the closed blades of moderately sharp-pointed scissors close to the cartilage and spreading the blades. In this procedure the cartilage was hugged in order to avoid injury to the hair follicles of the cilia and prevent buttonholing or otherwise traumatizing the structures between skin and cartilage. This scissors dissection was continued until the cartilaginous strip was attached only to the conjunctiva distal to the original incision and a portion of the lid margin. It was then found easy to evert the cartilage, so that the originally free (distal) edge of the cartilage became proximal, and the cut edge now constituted the new lid margin. The line of cilia thus came to be four or five millimeters above this new lid margin and pointed upward. The conjunctival surface of the cartilaginous strip formed the external surface of the lid between the cilia and new lid margin. It is apparent that the degree of this elevation of the cilia depended on the width of the carti-

laginous strip, and could be varied by changing the distance of the original incision from the lid margin. Well-marked overcorrection was always found necessary.

The dissected proximal part of conjunctiva was next fitted to the defect produced by the removed proximal portion of tarsus. The conjunctiva could usually be pulled down to cover all of this area as well as the cut edge of the cartilage, which now constituted the new lid margin. When this was impossible, as in cases of considerable conjunctival shrinkage and symblepharon, or in cases in which the conjunctiva was so intimately adherent to the tarsus that a combined tarsectomy was necessary, the conjunctiva of the fornix was mobilized by careful dissection with scissors. Cutting the subconjunctival tissues should be carefully avoided.

Before sutures were inserted, it was found important to free the lid margin and the conjunctiva to such an extent that no traction on any suture was necessary to maintain them in apposition. Three mattress sutures were inserted horizontally through the detached proximal part of conjunctiva about three millimeters from its free edge. The ends of the sutures were brought out through the external surface either just below or above the line of cilia, where they were tied. Usually the portion of conjunctiva inferior to the mattress sutures adhered to the cartilage, but if the wound gaped a few single sutures were inserted to approximate the edges.

When the operation was completed, the cilia lay flat against the skin of the upper lid, pointing upward. This position was encouraged by the application of a bland ointment. It was noted that a certain amount of realignment of the cilia took place. Instead of projecting at various angles as before operation, they tended to point upward and become more parallel. The immediate effect was a well-marked overcorrection which gradually subsided over a period of several months, leaving a good functional and cosmetic result.

The after care consisted of daily dressings with liberal application of boric acid or other bland ointment for about a week. The mattress sutures were removed on the fifth day, and the single sutures, when used, were removed the day after operation in order to avoid scarring of the lid margin. There was usually a period of transient lagophthalmos, during which the palpebral fissure was widened and the eye could not be completely closed. No cases of ptosis nor of persistent lagophthalmos were noted. The lid margin received adequate nourishment from the skin vessels, which were not disturbed by the operation. A slightly wavy lid margin was the rule after operation, but it was surprising how the unsightly boggy lid margin soon became pale, smooth, and thin as healing continued. The final cosmetic result could not be judged until at least six months had elapsed.

Note: Opinions and assertions contained herein are the private ones of the writer and are not to be construed as reflecting the views of the Navy Department or of the naval service at large.

U. S. Navy Hospital.

RELATIONSHIP OF HETEROPHORIA TO DIVERGENCE AND CONVERGENCE, BASED ON CLINICAL MEASUREMENTS*

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Milwaukee

Ever since the introduction of the term heterophoria into ophthalmology, interest in the subject has not abated, as witness 150 or more communications listed in the Index Medicus in the thirty years since the publication of Howe's book on the ocular muscles; nor is their number decreasing. A survey of the contents of these communications, however, discloses the fact that there is no unanimity of belief as to the significance of the concept. Most writers do not define the word explicitly, but by implication it is clear that the term is accepted as a synonym for: (1) latent squint; (2) abnormal position of rest of the eyes; (3) a tendency for the visual axes to deviate; (4) abnormal muscle balance, and possibly other concepts. In most publications, these conceptions of heterophoria are hypotheses suggested or implied by the writer but not precisely defined nor supported by formally marshalled clinical or experimental evidence. Actual explanations of the heterophoria in the sense of relating this concept to known physiological processes are few.

To define heterophoria as latent squint is to give an extremely vague definition of the term. It implies that we understand the production of heterotropia, and that heterophoria results when the factors that bring about squint are present in insufficient number. Similarly, to call heterophoria an anomaly of the position of rest is to imply that we know what the position of rest of each eye is in relation to its fellow eye, or at least to an arbitrarily chosen plane of the head. Neither the hypothetical position of rest nor the mechanism that produces it has been unequivocally elucidated. To define heterophoria as a tendency to deviation is merely to make a statistical statement; it in no way describes an individual mechanism.

However, it is also clear that no matter how vague or contradictory the mass of expression may seem when one reviews the entire literature, there is, nevertheless, a general understanding among ophthalmologists that when they speak of heterophoria, they mean the position the eyes assume when one of them is covered. Duane,[1] in fact, specifically defines heterophoria as follows: "In other instances both eyes will look straight at the same object when both are uncovered, but either eye as soon as it is covered will deviate—turning out, in, up, or down. This condition is called heterophoria." When heterophoria is thus modestly and objectively described as the reaction of a pair of eyes under certain simple, experimental conditions, the affection can more easily be examined critically and related to other functions of the eyes. It is conceivable that the position assumed by the eyeballs when the necessity for and the possibility of fusion are excluded is brought about by a balance of convergence and divergence, each of which may be postulated to behave as an integrated functional unit balanced against the other. Perfect balance would then result in lateral orthophoria, and excess of one or the other would result in heterophoria. Indeed, in the literature there are many references to lateral heterophoria which has been diagnosed as the result of divergence excess, divergence insufficiency, convergence excess,

* Read before the American Ophthalmological Society, Hot Springs, Virginia, June, 1937.

or convergence insufficiency. Duane, for example, does this in his edition of Fuchs's Textbook of Ophthalmology.

On the other hand, it is quite as likely that in the absence of convergence, the eyeballs assume a certain position merely because of a fairly proportionate distribution of tonic innervation of the extraocular muscles which holds the eyeballs in a position approximating that necessary for binocular single vision. When both eyes are uncovered, the impulse initiated by a desire for fusion could bring about a more precise adjustment either by direct stimulus to a muscle or to a group of muscles, or by means of a possible integrated impulse complex for divergence and convergence.

As a contribution to this part of the heterophoria problem, I have arranged the clinical measurements of 1,000 patients in such a manner as to make clear what relationship may exist between heterophoria, as defined by Duane, and the functions of divergence and convergence. The records were those of patients who had presented themselves for refraction, and were taken consecutively from the files until 1,000 had been collected without special selection. Only those were discarded which were deemed unsuitable for inclusion for the following reasons: All who had more than one-half diopter of hyperphoria; those who had a refractive error greater than four diopters, and those who had not worn an approximately correcting glass for their ametropia for some months. The last point probably is not important since Zentmayer[2] found that wearing a glass did not change the phoria materially. From these records the following data were used:

1. Exophoria and esophoria as measured by the Maddox rod at 20 feet: A difference of opinion is expressed in the literature as to the relative merits of several tests for phoria.

The only actual study recorded in the literature is comparison of measurement of 12 subjects by F. W. Weymouth,[3] who found that von Graefe's tests, the Maddox rod if the background behind the light be uniform, and parallax tests were all equally reliable.

2. Divergence was measured as the greatest prism (expressed in prism diopters) with which binocular single vision could be maintained when fixating a small light at 20 feet.

3. Convergence was expressed in degrees and was calculated by a formula given by Duane in Fuchs's textbook from the near point of convergence measured from the base line through the centers of rotation of the eyeballs (pcB) and the interpupillary distance.

In table 1 all the data are presented and arranged in groups so that all subjects having the same divergence are in one group. In each group the data are arranged in the order of increasing convergence. Mere inspection of the data as a whole reveals no correlation from which one might conclude that a balance between divergence and convergence determines the amount of heterophoria. If such a correlation did exist, the figures in the column recording phoria should gradually decrease from highest exophoria to orthophoria and then increase to greatest esophoria.

To show that this is not even approximately true, the data were regrouped so that the whole range of convergences was divided into groups increasing in increments of 5 degrees. This divided the convergences into almost the same number of groups as the divergences. The data arranged according to the latter scheme are shown in table 2.

In this table only the data for subjects having divergences of 8, 7, 6, 5, and 4 diopters are presented. In the other groups there were too few subjects to

TABLE 1

Diver. 13

	Ph.	C.
1	S5	33

Diver. 12

	Ph.	C.
1	X8	40
1	X7	53
1	S6	67
1	X2	71

Diver. 11

	Ph.	C.
1	X3	21
1	O	22

Diver. 10

	Ph.	C.
1	X3	34
1	X10	38
2	O	41
1	X10	44
1	S2	47
1	X2	49
1	X7	53
1	X7	54
1	X9	59
1	X3	59
1	S3	59
1	X4	65
1	X2	65
1	X1	65

Diver. 9

	Ph.	C.
1	O	26
1	S1	31
1	S1	32
1	X6	34
1	X6	35
1	X9	36
1	S1	36
1	S4	36
1	X4	38
1	O	38
1	X2	39
1	O	39
1	O	40
1	S1	41
1	S1	49
1	X3	51
2	O	51
1	X5	53
1	X3	59
1	X1	59
1	X2	63
1	O	63
1	S1	65

Diver. 8

	Ph.	C.
1	O	23
1	S1	27
1	X2	28

Diver. 8

	Ph.	C.
1	S1	29
1	X6	30
1	X3	32
1	X1	32
1	X10	33
1	X5	33
3	X1	33
1	S2	34
2	O	35
1	X8	36
1	S1	36
1	S2	36
1	X3	37
1	O	37
1	S4	37
1	X3	38
1	O	38
1	O	39
1	O	40
1	X2	41
2	S1	41
1	S2	41
2	S1	42
1	O	43
1	X4	44
1	X1	44
2	O	44
1	X1	45
1	S4	45
1	X5	46
1	X2	46
2	X1	46
3	O	46
1	S1	46
1	X5	47
1	X2	47
1	X1	47
1	O	47
1	O	48
1	S3	48
1	X1	49
1	O	49
1	S2	49
2	X2	50
1	O	50
1	S1	50
1	S9	50
1	X2	51
2	O	51
1	S1	51
1	S2	51
1	S5	51
1	X8	52
2	X2	52
2	X1	52
1	O	52
1	S1	52
1	O	53
1	X3	54
1	O	54
1	X5	55
1	X3	55
1	X2	55

Diver. 8

	Ph.	C.
2	X1	55
4	O	55
1	S2	55
1	X3	56
1	X1	56
1	O	56
2	X2	57
2	S2	58
1	S4	58
2	X1	59
1	S3	59
1	S4	59
1	X3	60
1	S1	60
1	X3	61
1	S2	61
1	S1	62
1	X3	63
1	X2	63
1	S3	63
1	O	64
1	S4	64
1	X6	65
1	X4	65
3	X1	65
2	O	65
1	S1	65
1	S2	65
1	S7	65
1	O	68
1	S2	68

Diver. 7

	Ph.	C.
1	O	21
1	X3	25
1	X2	25
1	O	26
1	X1	27
1	X3	28
1	X4	29
1	X2	29
1	X1	29
2	X1	31
1	O	31
2	X1	32
1	X1	33
1	O	34
1	X1	36
1	O	36
1	S1	36
1	X3	37
1	O	37
2	S1	37
1	X3	38
2	X2	38
1	X4	39
1	X2	39
1	O	39
1	S1	39
1	X1	40
3	X1	41

Diver. 7

	Ph.	C.
1	S1	41
1	X7	42
2	X3	42
1	S1	43
1	X2	44
1	X1	44
1	O	44
1	O	45
1	X1	46
2	O	46
1	S1	46
1	S2	46
1	S3	46
1	X2	47
2	O	47
1	S2	47
1	X6	48
3	O	48
1	S3	48
1	X1	49
2	O	49
1	S1	49
1	X2	50
3	X1	50
1	O	50
2	X1	51
2	S1	51
1	S2	51
1	O	53
1	X2	54
1	O	54
1	S1	54
1	X2	55
1	X1	55
1	O	55
1	S1	55
1	S6	55
1	X2	56
1	O	56
1	S2	56
1	X1	57
1	O	57
1	X1	58
1	O	59
1	S1	59
1	X2	60
1	X1	61
2	O	61
1	S2	61
1	S3	61
1	S1	62
1	X3	63
1	X2	63
1	X1	63
2	O	63
1	S3	63
1	S9	63
1	X2	64
1	O	64
2	X2	65
3	O	65
1	S1	65
2	O	66

Diver. 7

	Ph.	C.
1	S5	66
1	O	68
1	X2	70

Diver. 6

	Ph.	C.
1	X1	19
1	S1	20
1	X1	23
1	O	24
1	O	25
1	X3	27
1	X1	27
1	O	28
1	S4	28
2	X1	29
1	O	29
1	X1	30
5	O	30
1	S2	31
2	O	33
1	X6	34
1	X3	34
1	X2	34
2	X1	34
1	O	34
1	S4	34
1	X2	35
1	X1	35
1	O	35
1	X5	36
1	X2	36
1	X1	36
1	O	36
1	X1	37
3	O	37
1	S2	37
1	S3	37
1	X5	38
1	X2	38
1	X1	38
3	O	38
1	S1	38
1	S2	38
1	S5	38
3	X3	39
2	X2	39
3	X1	39
1	O	39
1	X4	40
2	X1	40
4	O	40
2	X2	41
4	O	41
1	S1	41
2	X2	42
5	O	42
1	S1	42
1	S3	42
1	S10	42
2	X2	43
1	X1	43

Diver. 6

	Ph.	C.
1	O	43
1	S6	43
1	X2	44
1	X1	44
5	O	44
2	S1	44
1	S2	44
1	S3	44
1	S5	44
1	X2	45
1	X1	45
3	O	45
2	S1	45
1	S3	45
1	S4	45
1	X6	46
1	X2	46
2	X1	46
3	O	46
1	S1	46
1	X3	47
1	X2	47
5	X1	47
2	O	47
2	S1	47
1	S6	47
1	X3	48
3	X1	48
2	O	48
1	X3	49
1	X1	49
2	O	49
1	S1	49
2	S2	49
2	S4	49
2	X1	50
3	O	50
1	S2	50
1	S5	50
2	X1	51
4	O	51
1	S1	51
2	S3	51
1	S5	51
1	X1	52
4	O	52
1	S1	52
1	S3	52
2	X2	53
1	O	53
1	S2	53
1	S3	53
1	X3	54
1	X2	54
1	O	54
1	X3	55
1	X2	55
3	O	55
3	S1	55
2	S2	55
3	S4	55
2	X1	56
4	O	56

TABLE 1 (*Continued*)

Diver. 6			Diver. 5			Diver. 5			Diver. 4			Diver. 4			Diver. 3		
	Ph.	C.		Ph.	C.		Ph.	C.		Ph.	C.		Ph.	C.		Ph.	C.
1	S2	56	2	O	32	1	X2	51	1	S1	28	1	S1	51	1	S4	37
1	S3	56	1	O	33	3	X1	51	1	S2	28	2	S3	51	1	S1	38
1	X1	57	1	S1	33	4	O	51	1	O	29	1	O	52	1	S3	39
2	S1	57	1	X1	34	1	S1	51	1	O	30	1	S2	52	1	O	39
1	X6	58	1	O	34	2	S2	51	1	S2	30	1	S6	52	2	O	41
2	X1	58	1	X2	35	3	S3	51	1	X1	31	1	X2	53	1	S1	42
5	O	58	1	O	35	2	O	52	1	S4	31	3	O	53	4	O	44
1	S1	58	1	X2	36	1	X2	53	1	X1	32	1	S1	53	1	S2	44
3	X1	59	1	X1	36	1	X1	53	3	O	33	1	S2	53	1	S4	44
5	O	59	1	O	36	1	X2	54	2	O	34	1	S3	53	1	S2	45
2	S1	59	2	S1	36	1	O	54	1	S5	34	1	S5	53	1	O	46
1	S2	59	1	S4	36	1	S1	54	1	X1	35	1	X1	54	1	S2	46
3	S3	59	2	O	37	1	X2	55	2	O	35	1	O	54	1	X2	47
1	X1	60	1	S1	37	6	O	55	1	S2	35	1	O	55	1	O	47
2	O	60	1	X1	38	1	S1	55	1	S4	35	1	S2	55	1	O	48
2	S1	60	1	X2	39	1	X1	56	3	O	36	1	S3	55	2	O	49
1	S6	60	1	X1	39	1	O	56	1	X1	37	1	S4	55	1	S4	49
1	X1	61	3	O	39	1	S3	57	1	S2	37	1	S5	55	1	S7	50
1	S1	61	1	S2	39	2	X2	58	1	S4	37	1	X2	56	2	O	51
2	S3	61	6	O	40	1	X1	58	1	X2	38	1	X1	56	2	O	49
1	X1	62	1	S2	40	2	O	58	1	O	38	2	O	56	1	S6	51
1	S2	62	2	X1	41	1	S2	58	1	S1	38	1	S1	56	1	S3	52
1	S3	62	2	O	41	1	S3	58	1	S3	38	1	S5	56	1	S1	53
4	O	63	3	S3	41	1	X2	59	1	X3	39	1	X1	57	1	S2	53
4	S1	63	1	X2	42	2	X1	59	1	X2	39	4	O	57	1	X1	55
1	S4	63	1	S3	42	5	O	59	1	X1	39	1	S2	57	3	O	55
1	X2	64	1	X1	43	2	S2	59	1	O	39	1	S2	59	2	O	58
2	O	64	4	O	44	1	X1	60	1	X1	40	1	X2	60	1	S3	58
1	S4	64	2	S1	43	1	O	60	3	O	40	1	S6	60	1	S2	59
2	X3	65	1	S2	43	1	S2	60	1	S1	40	1	S1	61	1	S1	60
1	X2	65	1	S3	43	1	X2	61	1	S9	40	1	S2	61	1	X2	63
3	X1	65	2	X1	44	3	X1	61	2	X1	41	1	O	63	1	S6	67
5	O	65	4	O	44	1	O	61	3	O	41	1	S2	63	1	X1	68
1	S1	65	1	S1	44	1	S3	61	1	S3	41	1	S4	63	1	X1	69
2	S2	65	1	S4	44	1	X2	62	1	X2	42	1	X2	64	1	O	69
1	S7	65	1	X3	45	2	X1	63	1	X1	42	1	O	64			
1	X4	66	2	O	45	1	O	63	1	O	42	1	S6	64	Diver. 2		
2	O	66	1	S2	45	1	S1	63	1	S2	42	1	X2	65		Ph.	C.
1	S1	66	1	S3	45	1	S3	63	2	S4	42	1	O	65	1	O	23
3	O	67	1	X1	46	1	S3	64	1	X2	43	1	S2	65	1	S2	27
1	S1	68	3	O	46	2	X3	65	1	O	43	2	S3	65	1	O	34
1	S5	68	1	S1	46	2	X2	65	1	S1	43	1	S5	65	1	S1	34
1	O	69	1	S4	46	3	X1	65	3	S2	43	1	S8	65	1	O	35
1	S3	70	1	X1	47	5	O	65	2	O	44	2	X1	66	1	O	36
1	X3	71	2	O	47	2	S1	65	1	X1	45	1	S1	66	1	S2	41
1	O	71	2	S1	47	5	S2	65	3	O	45	1	X1	67	1	S4	42
			1	S2	47	1	S3	65	1	S1	45	1	S1	68	1	O	46
Diver. 5			1	X2	48	3	S4	65	1	X1	46	1	S2	69	1	O	48
	Ph.	C.	1	X1	48	1	X1	66	1	O	46	1	X1	71	1	S2	55
1	X1	20	3	O	48	1	S1	66	3	S1	46	1	O	71	1	S4	57
2	O	22	1	S1	48	1	S2	66	1	S3	46				1	S4	58
1	X1	23	1	S2	48	1	O	67	1	O	47	Diver. 3			1	S2	63
1	X2	24	1	X2	49	2	S2	67	1	S1	47		Ph.	C.	1	S12	66
1	O	24	2	X1	49	1	S5	67	1	S1	48	1	O	25			
1	O	25	3	O	49	1	O	70	2	S2	48	1	S2	25	Diver. 1		
1	O	26	1	S2	49				1	S3	48	1	S1	26		Ph.	C.
1	X1	27	1	S3	49	Diver. 4			1	X1	49	1	S3	27	1	S4	32
1	O	27	1	S4	49		Ph.	C.	5	O	49	2	S1	32	1	S3	43
1	O	29	1	X2	50	1	O	21	1	S4	49	1	X2	33	1	S8	52
1	X1	30	2	X1	50	1	X1	22	1	S6	49	1	X1	34			
1	S1	30	2	O	50	1	S2	23	1	X2	50	1	X2	35	Diver. 0		
2	O	31	2	S1	50	1	X1	28	1	O	50	1	O	36		Ph.	C.
1	X1	32	1	S2	50	2	O	28	2	X1	51	1	X1	37	1	S14	48

TABLE 2

D \ C	21–25	26–30	31–35	36–40	41–45	46–50	51–55	56–60	61–65	66–70	71–75
8	1 0	4 X6-S1	10 X10-S2	10 X1 X8-S4	13 0 X4-S4	22 0 X5-S9	26 X1 X8-S2	14 0 X3-S4	18 9 X6-S7	2 0-S2	
7	3 X3-0	6 X4-0	7 X1-0	15 X1 X4-S1	12 X1 X7-S3	24 0 X6-S3	14 0 X2-S6	9 0 X2-S1	21 0 X3-S9	5 X2-S5	
6	3 X1-0	13 X2-S4	13 X6-S4	35 0 X5-S5	43 S1 X2-S10	42 0 X6-S6	38 0 X3-S5	39 0 X6-S6	35 S1 X3-S7	11 X4-S5	2 X3-0
5	6 X2-0	6 X1-S1	11 X2-S1	23 0 X2-S4	31 0 X3-S4	36 0 X2-S4	29 0 X2-S3	23 0 X2-S3	36 0 X3-S4	8 X1-S5	
4	3 X1-S2	8 X1-S2	14 X1-S5	20 S1 X2-S9	25 0 X2-S4	22 S1 X2-S6	23 S1 X2-S5	15 S1 X2-S6	15 S2 X2-S8	6 X1-S2	2 X1-0

treat them statistically. In each rectangle in the table with three figures, the upper one is the number of subjects in the group having the same divergence and convergence; the lower one gives the range of heterophoria; the central figure is an average of heterophoria for the group obtained by treating exophoria as a negative number and esophoria as a positive one. This figure may have no significance.

If heterophoria is determined by a balance of divergence and convergence, exophoria should increase from the bottom to the top in the vertical columns and from right to left in the horizontal rows. Esophoria should increase in the opposite directions. Obviously, the figures do not even approximate such an arrangement.

TABLE 3

Number	Divergence	Convergence	Range
1	13	33	—
4	12	58	40–71
2	11	22	21–22
15	10	52	34–65
24	9	44	26–65
122	8	49	23–68
116	7	48	21–70
277	6	49	19–71
210	5	49	20–70
153	4	47	21–71
54	3	47	25–69
15	2	44	23–66
3	1	42	32–52
1	0	48	—

In table 3 are shown the number of subjects in each divergence group, divergence, average convergence for each group, and the range of convergence in each group. The distribution of the numbers of subjects in each of the various groups suggests that the material as a whole is representative.

Comments

It is obvious that there is no correlation between these measurements of the functions in question, although the measurements are those that are widely used and that ophthalmologists feel called upon to interpret. The diagnosis of exophoria due to divergence excess, for instance, is based on such measurements. However, to emphasize the limits of the validity of

this conclusion, certain facts must be pointed out. The lack of correlation may be true only of the measurements rather than of the entities which have been measured. In the case of convergence and divergence mere measurement of the angular position of the ocular axes in maximum functional effort need not be a measurement of a power of that function in the sense that the power may be balanced against an opposing one. Then, too, the functions measured may not actually exist as physiological units. That convergence and divergence do, can hardly be doubted. However, the existence of a "phoria" as a centrally controlled stimulus to adjust the position of the eyes for binocular single vision in the absence of the fusion impulse has not been established.

Summary and Conclusion

In 1,000 patients who came for refraction, it was shown that the degree of exophoria or esophoria was not determined by a balance between divergence and convergence as expressed in the usual clinical measurements.

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THE SURGICAL TREATMENT OF TRACHOMA

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In another article[1] I mentioned, in addition to medical treatment two useful operations for certain patients with trachoma. I wish to present the details of these operations in this paper. In describing the operation of tarsectomy and mucous-membrane grafting I am quoting in part from my report of over 155 cases given to the All-India Ophthalmological Society and reported in their proceedings, 1929.[2] I refer in that article to the Central Provinces India Villager type of patient with trachoma, who comes to the hospital, stays a day, or a few days, and leaves—never able, or courageous enough, to come back for the prolonged treatment that will save his sight. When thorough treatment was impossible we turned to surgery as a measure of relief. The other operations previously performed for trachoma, with or without entropion and trichiasis, were not satisfactory. There were more failures than we liked. All our previous operations left any diseased tarsal-plate area to continue the destructive action of old trachoma. Furthermore, with previous operations we were unable to treat successfully other irritating conditions, such as multiple calcareous deposits in the tarsal conjunctiva and certain cases of vernal conjunctivitis. We then found described in Duverger and Velter's Ophthalmic Surgery[3] a really satisfactory operation from the surgical standpoint, for it removes the tarsal plate with its pathological tissue and replaces the lost tissue by mucous membrane from the lip. After starting this operation, we have been able to send the patients home with the prospect that they would, in all probability, have little, if any, further trouble from the trachoma; and the good chance that the cornea would be protected from further abrasive action and breakdown resulting from trachoma or other irritating lid pathology.

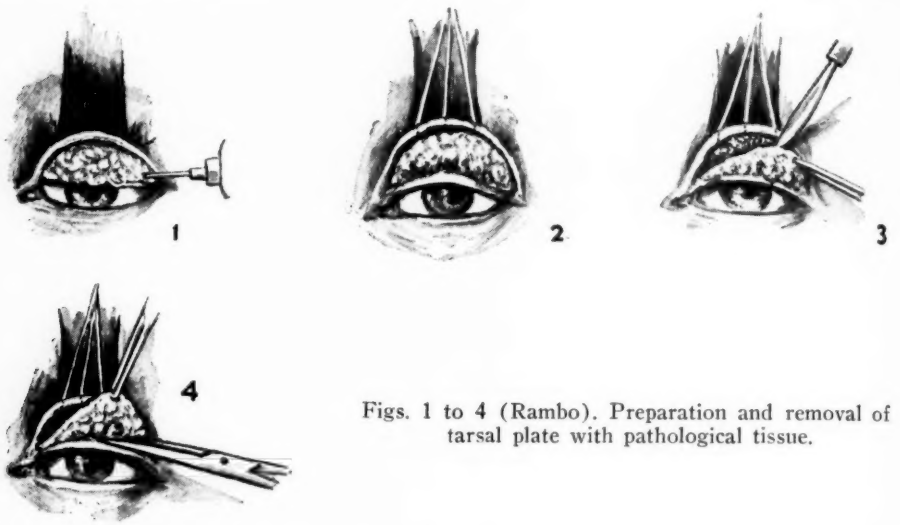
Listing the indications for operation we find tarsectomy with mucous-membrane grafting useful:

(a) In severe acute and chronic trachoma with pannus for persons who cannot be kept under observation and who cannot undergo proper treatment.

(b) In severe cases of trachoma which are not improving under treatment, especially those wherein the sight is endangered by corneal irritation.

and also in cases of severe unresponding vernal palpebral conjunctivitis. The mucous membrane from the mouth does not become affected with trachoma or vernal conjunctivitis.

Entropion and trichiasis of themselves should not be operated upon by this method. (See report of operation for such cases below.) If, however, with entropion and trichiasis active, dangerous trachoma is still present, tarsectomy and mucous-



Figs. 1 to 4 (Rambo). Preparation and removal of tarsal plate with pathological tissue.

NOTE: Cases in this category that are complicated by the upper lid resting heavily or closely pressing upon the eyeball add a further indication for the necessity of this operation.

When there is much corneal irritation with or without stainable ulcers of the cornea, this operation should be delayed until every effort is made to heal the ulcers and quiet the irritation as much as possible. The quieter the cornea at the time of operation the better. However, when the irritation of the cornea becomes worse and danger to sight from the lid increases it is necessary to operate even under such unfavorable conditions.

(c) In certain cases of conjunctival and subconjunctival calcareous deposits

membrane grafting should be performed.

(d) Where, from trachoma or treatment of trachoma, there has resulted symblepharon with shortening of the conjunctiva and fornix, the grafting of mucous membrane with or without tarsectomy or with partial tarsectomy should be considered.

Proper preparation of the patient and anesthesia of the lids makes the operation easier. (1) Nembutol 0.1 gr. is given the night before to assure a good rest and also to determine the reaction of the patient to barbiturates. (2) This nembutol is repeated one hour before operation, while morphine sulphate 15 mg. (or less for older patients), with atropine 0.4 mg. is given by hypodermic, one-half hour be-

fore operation. (3) Pontocaine 1 percent is dropped into the conjunctival cul-de-sac at intervals four minutes apart, two or three times. (4) The upper lid is then everted and novocaine 2 percent with epinephrine 1-1000 (one drop to 4 c.c. of novocaine) is injected (fig. 1) through the conjunctiva into the upper fornix, ballooning out this area along its whole length, especially medially and laterally. Injection of the fornix completed, the needle is left in position while the lid is released. The needle is then carried to the subcutaneous tissues over the tarsus along the line of the attachment of the elevator to it from the lateral to the medial portion and the subcutaneous tissues well injected. (5) An injection of novocaine is made (a′) in the lower-lid skin area near the middle of the lid border, and (b′) 1½ cm. below the lid border. (6) Injection is also made of the submucous area on either side of the midline of the well-everted lower lip (only on one side if only one graft is going to be required). Four cubic centimeters of novocaine solution for the eye and 5 c.c. for both sides of the mouth are usually sufficient.

If both sides are to be operated upon, which is not recommended in cases which will permit operations one at a time, one side is anesthetized just before the operation is started on that side.

Figure 1 shows the everted lid with Jaeger's hard-rubber lid plate underneath it, giving slight support, while the needle of the syringe carrying the anesthesia has been introduced so as to balloon out the fornix with the anesthetic solution as mentioned. Jaeger's lid plate may be omitted at this stage of the operation. It is possible to use Ehrhard's lid clamp instead of the plate, and some may prefer to do so.

Figure 2 shows three medium-sized silk sutures applied to the edge of the lid and these held in notches (not shown in illustration) made at the upper end of Jaeger's lid plate. In one case a wooden tongue depressor was whittled to make a spoon, notches in its upper broken end being cut to hold the sutures while the operation was proceeding. This figure also shows the incision which is made along, and parallel with, the border of the lid just above the openings of the meibomian ducts. This incision goes through the tarsal plate, care being taken not to injure any of the soft tissues superficial to the tarsus. Some textbooks tell of the saving of conjunctiva from the top of the tarsal plate, but this is a time-consuming and often ineffectual procedure. It is no longer practiced because the mucous-membrane graft covers the denuded area, and nothing more is needed.

Figure 3 shows the dissection with a sharp knife of the tarsal plate from the muscle and other subcutaneous tissues. This dissection is carried from the incision mentioned above to the insertion of the levator aponeurosis. Careful attention is given to preserving every bit of muscle and tendon, for these are essential to the preservation of the function of the lid. When the tarsal plate is loose except for the attachment at its upper border (fig. 4), the plate is pulled up slightly and bent over on one blade of medium-sized straight operating scissors. The line of demarcation between diseased and healthy tissues is then distinctly discernible. Small snips of the scissors separate this tarsal plate and the diseased trachomatous tissues from the undiseased fornix above. Every granule at this line of demarcation may, or may not, be removed, for the fornix tissue is well above the cornea and any granule or particle of granule left, we believe, gives no perceptible trouble later. No attention need be paid to bleeding points unless excessive, for these usually stop in the sewing later. A careful dissection of the tarsal plate from the subcu-

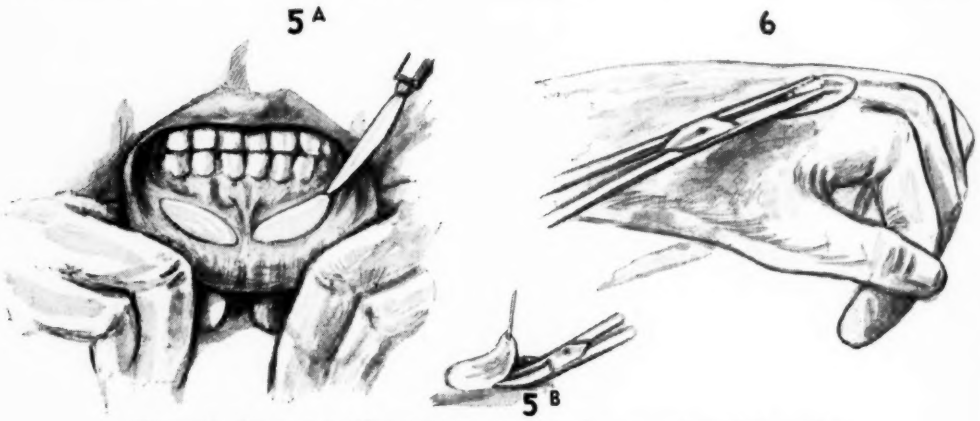
taneous tissue usually eliminates the section of the larger vessels. If tying-off of a bleeder is necessary it is done.

Some surgeons proceed in this operation to this point, but use no grafts to replace the tissue removed. We also omitted the grafting in some of our first cases. The longer convalescence because of granulating (not trachomatous granulating) tissue which was often bunchy and had to be cauterized, showed us we should follow the more correct surgical procedure of applying a graft to the denuded area. When we noted our results we were sure we were right. We obtained the mucous membrane for the graft from the lower lip.

Figure 5A shows the assistant's hands everting the lower lip. The tarsal plate, which has been removed, is now dried, and placed upon the area from which mucous membrane is to be removed. A slightly (all around 1.5 mm.) larger area than the removed tarsal plate is then outlined with a sharp knife as shown, one end of this is hooked up (fig. 5B) and with the small scissors is snipped away from the underlying tissues, taking all the mucous membrane but leaving all the submucous tissue possible.

Upon removal of the graft, it is placed on the back of the hand (fig. 6), and, using pressure with a moderate-sized straight surgical scissors, the excessive subcutaneous tissues with any fat particles are removed. Patience is needed here to remove every bit of this subcutaneous tissue within reason, so as to have a thin pliable covering for the denuded area.

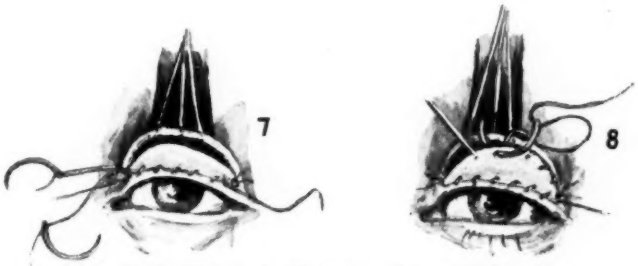
After the graft is prepared properly, a suture (fig. 7) is passed from the mucous-membrane surface at the end of the graft through the graft, and then through one, either lateral or medial, angle of the denuded area's border. This suture being tied, the opposite angle of the graft is sewed with another identical interrupted suture to the other angle of the denuded area. The ends beyond these angle-interrupted sutures are cut short enough so they will not extend out of the eyelids. Having reached underneath the everted lid and drawn the retracted fornix edge down, a continuous suture is started through the fornix, then through the lower border of the graft, continuing across and completing the suture in the opposite fornix tissue. Both ends of this suture are left out, beyond the medial and lateral canthi. No tie is made at either end of this continuous suture. Duverger and Velter showed this suturing by interrupted sutures throughout. It was found, however, that the knots playing over the



Figs. 5A, 5B, and 6 (Rambo). Removal and preparation of transplant.

cornea, tended to increase the possibility of ulceration, and were therefore discontinued. The only knots on the conjunctival side are placed at either angle away from the cornea. Sometimes these too are omitted, no knots whatsoever being made.

Figure 8 shows the continuous suture started from the lid conjunctiva at the angle and being carried up, bringing the lower border of the graft to the edge of the lid. It is very important here to suture the graft to the more superficial (deeper



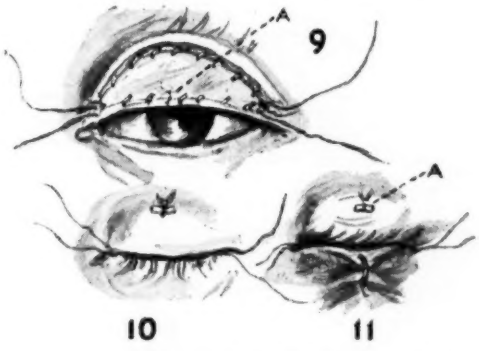
Figs. 7, 8 (Rambo). Suturing the graft in place.

in the everted lid) parts of the border of the cut lid, even to the soft tissues near the skin. In this way the mechanics of the pull of the graft on the lid tend to turn the lash border out. I have had a recurrence of trichiasis almost immediately following the operation, due to neglect of this detail.

Figure 9 shows the completion of the two continuous sutures, and the previously placed interrupted angle sutures. A third suture is very useful, and is shown in this illustration. A silk suture, double armed with curved medium-sized-eye needles, is placed at this time from the fornix through to the skin outside, and from the edge of the graft, also through to the skin outside; and lightly tied over a tiny roll of cotton or small piece of rubber (as shown in figure 10 and especially in 11-A). Figure 11 shows the completed operation, with the lashes of the upper lid turned up ready for the bandages.

There is also shown in figure 11 a very important step in the final stages of the operation: a suture is made between the cartilage at the edge of the lower lid and the skin of the cheek, about a 1½ cm. down from it. This suture upon being tied, overcomes the spasticity of the lower lid. This spastic lid, if not attended to, presses down upon the cornea, occasionally causing a line of ulceration. It always, unless held down, irritates the graft by taking a position under the relaxed and low-hanging upper lid. With this suture in place, the lid borders are fairly well approximated; the graft is allowed to heal in position, while the cornea is protected from the pressure of the otherwise spastic lower lid. The lashes of the upper lid are seen bent up. The lashes remain in this overcorrected position as the gauze and cotton eye dressing is applied. On the first change of the bandage, in 24 to 48 hours, and before the bandage is reapplied, the lashes are brought down again to their normal position.

In occasional cases in which there has



Figs. 9, 10, 11 (Rambo). Completion of the sutures and of the operation.

been considerable trichiasis along with trachoma, it is necessary to remove an oval area of skin from the upper lid. The bringing together of the edges of the denuded area helps to keep the eversion of the edge of the lid, thus preventing the lashes from again reaching the conjunctival sac. In some of our cases a blepharochalasis was present. In some cases, even though there was no trichiasis, the oval area of skin was removed from the upper lid as described above for cosmetic and prophylactic purposes.

At the end of four or five days the pressure bandage is removed, as is also the last suture placed as described under figure 10. On the seventh day the two threads from the continuous suture are, on the medial side, cut close to the angle of the eye, and the suture is pulled out by traction on the threads that are hanging out of the lateral angle. The two interrupted sutures at the angle may come out by themselves, or if still present at the end of 10 days they may be removed at that time.

Following my previous report, several hundred further operations have been performed. Even though we have taken the graft with offensive pyorrheal gums adjacent, we never have had any infection. The mucous-membrane graft taken from the lip does not become trachomatous. There are a few cases in which, despite the operation, there is a continuation of some chronic irritation of the rest of the conjunctiva and of the grafted mucous membrane. The grafted mucous membrane even though seemingly congested does not damage the cornea as in cases of trachoma. Usually the pannus markedly improves, and in many cases vision has been restored from the ability to see finger movements to 6/10. In all cases, what vision there is is preserved and improved. In one case cataracts were seen when the patient came back a year after operation. The iris or lens could not be seen before operation. We have had no case of ptosis following operation. In one of our earlier cases there was a slight droop in the lateral border of the lid.

Case Reports. Mrs. C. and Mr. A., both of Idaho, were patients with chronic trachoma, treated and operated on in the service of Dr. A. C. Jones in St. Luke's Hospital in Boise, Idaho. Mrs. C. had a case of chronic trachoma that had resisted careful painstaking treatment intermittently over six years. Her vision was seriously affected, and gradually decreasing acuity was noted together with other discomforting symptoms of trachoma. Mr. A. had trachoma of both eyes, apparently contracted some years before on an Indian Reservation in the South. This had recently become very severe, and decreasing acuity of vision was noted from week to week until treatment was started. He had only one eye from which he could see, and this poorly; the other eye was blind. He also had all the discomfort that accompanies trachoma. A farm hand, his employer would not allow him to be away from his duties; nor could he afford to discontinue his daily labor. Whenever he came for treatment (13 miles) it took one-half day before he could return. When the possibilities of operation were mentioned to him he very gladly consented, for the treatment started had not helped him sufficiently to encourage him in continuing it.

Mrs. C. had the tarsectomy with mucous-membrane grafting performed on one eye at a time. Mr. A. had this operation performed on both eyes at the same time; because one eye was scarred and so only one good eye was endangered. The relief to both of these patients was very gratifying indeed: the pannus decreased, and the vision increased as long as they were under observation. There was, in Mrs. C.'s case, some continuation of the

lacrimation and some congestion in one eye. Was this due to the congestion of the slight continuing granulations of the lower lid? Under mild collyria this greatly improved, and at the time of making the report some months afterward, the patient was not returning for regular observation, being satisfied with the very marked difference between the former discomfort and the present relief.

Conclusion. That tarsectomy with mucous-membrane grafting is an operation recommended in all cases of trachoma is by no means the idea intended to be given, as those who will read the first article in this series will see. There are cases, however, of intractable trachoma, which might possibly heal after undergoing a great many months or even years of medical treatment. Some of these show a cornea that is losing its transparency from pannus in a way dangerous to sight. Some patients will not, or cannot, for economic or other reasons, take regular treatment. There are also cases of chronic trachoma in which entropion with trichiasis, or with near trichiasis and a tight lid giving symptoms of chronic irritation, are so harassing to the patient that an operation of this kind is indicated. It is a major procedure, useful in certain cases, and has in the author's hands brought relief to a great many whom he was unable, or not allowed, to help otherwise.

A SIMPLE OPERATION FOR ENTROPION OF THE UPPER LID

The operation for tarsectomy with mucous-membrane grafting is used as just mentioned in cases of active trachoma which promise continuation of the damage from trachoma itself even after entropion has been corrected. The operation to be described is for entropion with or without trichiasis when trachoma is healed or so arrested as to be no longer a possible source of dangerous continuation of infection. I saw this operation used in the Tung Wah Hospital in Hong Kong by Dr. S. To Wang and his associate, Dr. S. S. Chan. It was reported by Dr. F. W. Goddard, of Shaoshing, in the Chinese Medical Journal.[4] So satisfactory is his description of the operation that I am quoting from his article for the word picture of the operation; and am adding the illustrations made by Mr. E. F. Faber, of Philadelphia, to elucidate the text. Dr. Goddard has been using this operation for about 25 years and only two of his patients have returned with recurrence. The Tung Wah Clinic, where Dr. Wong is operating, has had no recurrences in a very large practice over several years.

Figure 12A shows the condition of the eye calling for this operation; B shows the same with the lid everted. I quote from Dr. Goddard's article:

"In principle the operation consists in incising the tarsal cartilage throughout its entire length through the palpebral conjunctiva, everting the marginal portion by suitably placed sutures which are left in place until the wedge-shaped gap between the edges of the severed cartilage is filled in with new tissue, forming as it were a splint which maintains the two portions of the cartilage permanently in the new position.

"The operation is performed as follows: After preparation and anesthetization of the field in the usual manner (fig. 12 A) the lid is everted (B) and five or seven half-curved needles threaded on a silk suture, say 20 inches or so in length (C), are passed between the cartilage and the skin, entering at the upper border and emerging near the ciliary margin (D). In ordinary cases five needles are enough but when the entropion is marked seven may be placed to advantage, and in such cases also it is often helpful to place the middle needle first, as this then serves as a splint maintaining eversion of

the lid while the remaining sutures are being placed.

"When all the needles are in position an incision is made from one palpebral angle to the other through the entire thickness of the cartilage, the needles serving as guides to prevent the knife from penetrating too deeply (D). The needles are now drawn through and the loops of suture cut at convenient lengths for tying (E), the cut ends being tested and clamped in pairs.

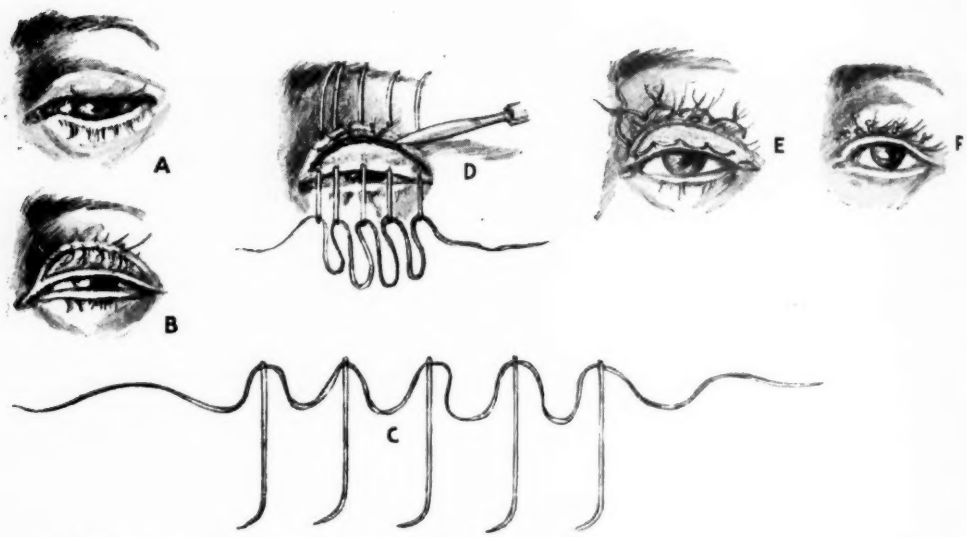


Fig. 12 A to F (Rambo). Steps in the Goddard operation for entropion of the upper lid.

The lid is now returned to its normal position, and the sutures tied with just enough tension to secure a considerable overcorrection (F) and the line of knots covered with collodion. (Touching with some antiseptic tincture, as merthiolate, is all that is necessary.) In some cases there is a tendency for the sutures to cut into the skin, making removal a little troublesome, but this may easily be obviated by tying them over a bit of rubber tissue. In order that the scar tissue may become sufficiently firm it is well to leave the stitches in place for from eight to ten days.

"This operation depends for its success on correction of deformity in the tarsal cartilage without dependence upon the uncertain tension of skin flaps, it is easily performed, and it leaves no visible scar."

Report of a case of entropion with trichiasis in which this operation was used. Mrs. C. M. N., a white woman whose occupation was housework, aged 64 years, came to Dr. A. C. Jones's office on March 8, 1929, complaining of dimness of vision of both eyes, especially the right, and some itching and discomfort of the right eye. She had had trachoma in childhood and it had lasted on and on. After recovering from a period of severe pain and "mattering" (ulcers) of both eyes, she found that she could not see so well as formerly with the right eye, and to a lesser degree, with the left eye. Vision: R.E., ability to count fingers at a meter; L.E., 6/60.

At that time the lids of both eyes were shortened from the longstanding trachoma. Entropion was present, but no trichiasis. Several small corneal opacities were noted.

No treatment of the lid condition was indicated at that time. An optical iridectomy was performed on the right eye.

The patient returned to the office again on May 27, 1937. She reported that a plastic operation for trichiasis of the upper lids had been performed elsewhere in the meantime. At this time I took charge of the case. She complained of further dimness of vision and constant irritation of the right eye, demanding repeated blinking. There was slight excess of tears in the conjunctival sac, but no epiphora of her left eye. She counted fingers at 20 cm., with the right eye, and at 90 cm. with the left eye.

The lids of both eyes were smaller than normal and slightly congested. Horizontal linear cutaneous scars of both upper lids from the operation mentioned in the history were just visible. Entropion was present in both eyes. It was moderate in the upper left lid and needed no treatment, but in the upper right lid trichiasis of both nasal and temporal borders was present. The trachoma of both eyes had completely healed and the lids had the typical furrowing of the subtarsal fold. There was pannus from the old trachomatous process, and trichiasis over the right nebulae-spotted cornea. The coloboma of iridectomy was present and a moderately mature cataract.

The patient entered St. Luke's Hospital, Boise, Idaho, for operation on June 6, 1937. She was operated on on the next day. In preparation for the operation, besides the usual instruments for a plastic operation, seven needles (two more than shown in the illustration) were threaded on a number 4 surgeon's silk thread about 50 cm. long. These needles were placed at intervals along the thread—arranged in order on a towel to be transferred to the area of the cheek. In this case, there being no central entropion, the central needle of the seven was not introduced. This eliminated the central sutures, leaving two sutures lateral and two medial. Incision was made and the operation completed as described.

The operation on completion left the margin of the lid so everted that even the lowest lash was out at almost right angles from the border. It appeared definitely overcorrected. The incision through the tarsal plate acted as the position for the hinge action of the everted edge. No bandage was applied. The patient left the hospital on the third day and returned to the office at the end of 10 days for the removal of sutures. There was slight irritation of the eye while the granulating of the incision in the tarsal plate continued. This was healed within two weeks and the lid took a normal position, the former scratchiness was relieved, and some months later the cataract of that eye was removed. There was no tendency to recurrence, and no grossly visible sign that any operation on the lid had been performed.

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OCULAR SIGNS OF INTRACRANIAL DISEASE IN CHILDREN AND JUVENILES

A REPORT OF FORTY-TWO CASES*

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Ocular symptoms and signs associated with intracranial pathology are well known and generally recognized, but often in children and adolescents, examination of the eyes is neglected because of the alleged rarity of brain tumor at an early age. Intracranial neoplasms in children[1] are not common but they do occur and are, as in adults, frequently accompanied by ocular manifestations; consequently, an ophthalmic examination may enable one to confirm a suspicion of intracranial disease or even to make a diagnosis. If the possibility of an intracranial neoplasm is not borne in mind, children may be treated for other conditions; for example, for malnutrition resulting from persistent vomiting; or they may be fitted erroneously with glasses to correct failing vision associated with choked disc or optic atrophy. It must be recalled that the skull in infancy and early childhood may distend to compensate for space occupied by an intracranial growth or increased intracranial pressure and consequently symptoms may not appear for some time. Furthermore, symptoms of brain tumor in children are usually not so definite as in adults, and perimetric studies and neurological examinations are made with much more difficulty.

Every child with symptoms that might in any way create a suspicion of intracranial disease should have a thorough general and neurological examination and a complete ophthalmological examination; that is, determination of the visual acuity, studies of the fundi and visual fields, and of the actions of the extraocular muscles. There should be a blood Wassermann test, roentgenograms of the skull and ventriculograms, if indicated. Examination should be repeated at intervals in those cases in which an unconfirmed suspicion of an intracranial lesion continues. Sachs[2] in his recent work on "Diagnosis and treatment of brain tumors" emphasizes (a) that choked disc is the most important clinical sign of brain tumor but that, on the whole, it is a late symptom of increased intracranial pressure; (b) that the test of greatest importance in the diagnosis and localization of brain tumor is the perimetric field; and (c) that the incidence of brain tumor is unexpectedly high, only tumors of the uterus, stomach, and breast being more often encountered.

This report is based on studies, over a period of 28 months, of the ocular changes that occurred with intracranial disease in 42 children and adolescents, aged 2 to 18 years. The importance of ocular examinations are brought clearly to light. Several of the children were referred to the Eye Clinic by the home physician because of loss of vision or because of an extraocular muscle palsy; other cases were referred from various departments in the hospital. The pediatrician, the neurologist, and the ophthalmologist have a common interest in intracranial diseases, and consultation is valuable if a correct diagnosis is to be reached. It has been emphasized that

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when ocular findings are present, the intracranial pathology is probably advanced. This makes it even more imperative that ocular examinations should not be delayed nor overlooked.

Diagnosis of intracranial disease was verified in 31 of the 42 cases while in 6 the diagnosis was based only on clinical findings, and in the remaining 5 cases the etiology remained unknown (table 1). Noteworthy is the fact that, of the entire group, 55 percent of the cases (23) were proved brain tumors. Even more noteworthy, from the standpoint of diagnosis, is the fact that in only 2 cases (4.8 percent) were the optic-nerve heads normal. Extraocular-muscle palsies occurred in 12 cases (28.6 percent) and nystagmus was present in 9 cases (21.4 percent) (table 2). The ocular findings in the children with brain tumors are tabulated in table 3 and the findings in lesions of supratentorial and subtentorial origin may be compared by referring to tables 4 and 5, respectively.

Choked disc

Many theories have been advanced as to the mechanism of the production of papilledema. That choked discs may occur as a result of interference with the circulation of the optic-nerve heads is borne out by the experimental work of Cushing and Bordley[3] and the subsequent pathologic studies of Paton and Holmes.[4]

Choked discs in brain tumors in general: As has been reported in the literature, the percentage of tumors of the brain accompanied by choked discs varies greatly, but recent reports show that more and more cases are diagnosed that show no signs of papilledema. Gjessing[5] is of the opinion that choked discs are the most important finding in tumors of the brain. Both Paton[6] and Brain[7] reported that approximately 20 percent of cases of tumors of the brain do not have choked discs. This has been the generally accepted figure. Van Wagenen[8] found that 17 out of a series of 145 cases of intracranial tumors showed no signs of edema of the nerve heads. Elsberg[9] stated that more and more cases were coming to operation in which papilledema was absent. Strauss,[10] in a recent report of 100 histologically verified tumors of the brain, stresses the fact that only 48 were associated with papilledema. He cites these figures to show that the incidence of choked discs in brain tumors is not so common as was once believed, and that this is, perhaps, due to improved methods of diagnosis.

Choked discs in brain tumor in children: The incidence of choked discs in tumors of the brain in children also varies in different reports. Di Gaspero[11] reported three cases of cerebellar tumor in children in the first decade of life who showed no papilledema and stated that choked discs are less often found in cerebellar tumors during this period of life than in adults, but Breitenborn,[12] in reporting 38 cases of tumor of the brain in children from 5 to 10 years of age, inclusive, comes to the conclusion that the cardinal sign of increased intracranial pressure is papilledema. Rand and van Wagenen[13] in a study of 38 cases of brain tumor in children, aged 6 months to 11 years, stated that 73.6 percent had papilledema. They furthermore emphasize that errors in diagnosis were made by the referring physician in 11 cases and that the physician would have been correct more often if there had been an examination of the fundi. This again shows the extreme importance of a fundus examination in every case. Critchley[14] believes that more than 80 percent of cases of brain tumor have papilledema and states that papilledema in children is often intense, the swelling measuring as much as

eight diopters. Gross[15] in reporting nine cases of brain tumor in infants, all under the age of two years, states that five had choked discs, three had retinal venous engorgement, and that only one had normal nerve heads; this is an important finding in view of the fact that the skull during infancy may readily yield to increased intracranial pressure. Habel,[16] in reporting 10 cases of tumor of the brain in children 15 years old or younger, states that in spite of hospitalization a fundus examination was neglected in three cases and that five of the seven examined had choked discs. Lyerly,[17] in reporting five cases of brain tumor in children under 11 years of age, states that four had choked discs. The reports of these various authors emphasize the importance of choked discs as a sign of brain tumor. The finding of edematous nerve heads always indicates the possibility of a brain tumor until proved otherwise; the omission of a fundus examination cannot be considered other than gross negligence.

In the 42 cases of intracranial lesions herein reported, normal optic discs were found in only two cases: in one of these a cerebellar tumor was discovered, whereas the other presented an old encephalomalacia of the left frontal lobe. In 37, or 88 percent of the cases, either choked discs or postpapillitic atrophy was found; in two additional cases of optic atrophy it was impossible to differentiate the type. In only 23 (55 percent) of the 42 cases was there a tumor of the brain. Thus, although pathologic changes in the head of the optic nerve should always arouse a suspicion of possible tumor of the brain, a neoplasm is not invariably found. Of the cases presenting a brain tumor, either choked discs or postpapillitic atrophy was found in 87 percent on. admission; one case developed choked discs after admission to the hospital, one presented normal discs, and one an optic atrophy of undetermined type.

Choked discs or postpapillitic atrophy was present in all except one patient with supratentorial tumors; this one patient had an optic atrophy of undetermined type. With the exception of one child with normal nerve heads, either choked discs or postpapillitic atrophy was observed in all children with subtentorial tumors; the choked discs in these cases were especially prominent and measured up to 6 diopters. It was surprising to note that, in several cases, 4 to 6 months after decompression and roentgen-ray therapy, choked discs of 6 diopters had completely disappeared without leaving any evidence of postpapillitic atrophy.

An exploratory operation was performed on one child who was believed to have a tumor of the brain. The discs were normal in this case and visual fields could not be studied because of lack of coöperation. Nothing was found on exploration of the intracranial contents. A bilateral neuroretinitis developed soon after the exploration. The blood pressure varied from 200/90 to 250/120. At necropsy a diagnosis of arteriolar hypertension was confirmed. This case illustrates the not infrequent difficulty of accurate clinical diagnosis.

Five cases of bilateral papilledema in which the etiology was never determined are of interest: A bilateral optic-nerve-head edema of 2 diopters was noted in a young diabetic on routine fundus examination. On questioning she stated that she had had headaches for two weeks. She was thoroughly studied but no other positive findings were noted. The discs soon returned to normal and have remained so on repeated fundus studies.

A five-year-old girl had some visual loss and vomiting. Bilateral papilledema with retinal hemorrhages and macular edema were found. A secondary optic

atrophy and total blindness developed in the right eye; the left shows some post-papillitic atrophy, but the central vision is now normal.

A 14-year-old girl came to the clinic stating that her vision had practically been lost during the previous month. She had approximately 2 diopters of edema in either nerve head. Her vision was only 1/60 in each eye and several paracentral scotomata were present in each visual field. No other signs were noted although she was thoroughly studied. Seven months later her vision, visual fields, and discs were approximately normal. This may have been an optic neuritis.

A seven-year-old boy was referred to the Eye Clinic with a history of headache and vomiting of two months' duration. The vision was normal, but a bilateral edema of the nerve heads accompanied by retinal hemorrhages was noted. There were no other findings, and six months later the fundi were normal and the child appeared to be well. The neurologist suggested the possibility of a chronic encephalitis.

Another youngster, a 12-year-old boy, was referred to the Eye Clinic because of fever, headache, vomiting, and "squint" of nine weeks' duration. The only findings were bilateral papilledema of two to three diopters, enlargement of the blind spots, a paresis of the right lateral rectus and a spinal-fluid pressure of 200 mm. water. Three months later some edema remained, but an early bilateral post-papillitic atrophy was evident. The vision and peripheral visual fields were essentially normal.

Choked discs with high-cervical-cord tumor: Choked discs associated with high cervical-cord tumors are rare. The cause of the increased intracranial pressure and the subsequent papilledema is a matter of conjecture. Collier,[18] who probably was the first to report the condition, saw a patient who had a small tumor at the level of the third cervical root; no intracranial pathology was observed at necropsy. Elsberg[19] makes no mention of the occurrence of choked discs in cases of spinal-cord tumor in his excellent treatise on these growths. Elsberg and Strauss[20] reported five cases of high-cervical-cord tumor but did not find papilledema in any. Davis[21] reported a high-cervical-cord tumor associated with choked discs before the New York Neurological Society; the papilledema subsided following a laminectomy. Carlill and Carling[22] reported a high-cervical-cord tumor with 3 diopters of papilledema of the right nerve head and hemorrhages about the left disc; the edema subsided rapidly following a cervical laminectomy. McAlpine[23] wrote of choked discs of 3 diopters associated with a glioma between the first cervical and the first thoracic levels in a 20-year-old woman. There was no cerebral tumor, but a moderate bilateral hydrocephalus was noted at autopsy.

Case of spinal-cord tumor: An 11-year-old girl was referred to the Neurological Service following a laminectomy for removal of an intramedullary ependymal-cell glioma of the spinal cord which extended from the fourth to the seventh cervical vertebra. A typical upper-cervical-region-tumor syndrome had been present. On admission vision was normal, but bilateral choked discs were present. Roentgen therapy was administered over the site of the tumor and the patient improved rapidly. Four months after admission the nerve heads were normal. It could not be determined whether choked discs were present before the laminectomy was performed. Although an intracranial lesion is not conclusively ruled out, it appears that this was a case of choked discs occurring in a high-cervical-cord tumor.

Vision

A complaint of poor vision in six cases with brain tumor (five subtentorial, one supratentorial) resulted in the first examination of the children. This was, therefore, the important complaint in 26 percent of the cases with tumors of the brain. Rand and van Wagenen,[13] in reporting their series of 38 cases of tumors of the brain in children, state that in only 18 percent of the cases were visual disturbances mentioned in the history, although 73.6 percent of their cases revealed the presence of choked discs. This substantiates the well-known fact that choked disc may not be accompanied by loss of vision; but any patient complaining of failure of vision should not be refracted without a thorough fundus examination. Poor vision is a late symptom of intracranial disease and a diagnosis should be possible before it occurs.

Diplopia

This symptom was present in only four patients although there were 12 cases of extraocular muscle palsy. It was present twice in subtentorial lesions, once in a case of supratentorial tumor, and once in an undiagnosed case.

Nystagmus

Gray[24] found that nystagmus, contrary to the opinions of some authors, is not necessary in the diagnosis of posterior-fossa tumors. In 11 intracerebellar growths out of 51 posterior-fossa tumors, verified by surgery or necropsy, no nystagmus was observed. Moreover, he found nystagmus in 8 out of 40 verified cases of tumor anterior to the cerebellum. Weisenburg and Work[25] stated that involuntary nystagmus is nearly always cerebellar, but voluntary nystagmus is the result of implication of those fibers that are in relation to the vestibular apparatus outside of the cerebellum; they do not state, however, whether or not nystagmus is always present in posterior-fossa growths.

Nystagmus was noted in nine of the cases here reported, and in each instance it was associated with a brain tumor. In eight of the cases the lesion was subtentorial. The nystagmus was always of the horizontal oscillatory type. The significance of nystagmus probably lies more in the fact that its cause should be determined, rather than that it indicates a subtentorial lesion.

Extraocular-muscle palsy

The appearance of paralytic squint in several of the children led to consultation with a physician, and eventually the underlying pathology was recognized. A unilateral rectus palsy was noted in seven of the cases reported while a bilateral rectus palsy was found in four. One patient had a palsy of the right superior-oblique muscle. These palsies were most often associated with tumor of the brain, but a lateral-rectus palsy was present in a temporal-lobe abscess, in a case of hemorrhagic purpura and in one case the etiology remained unknown. Extraocular palsies were not of definite localizing value, inasmuch as they occurred with brain tumor, increased intracranial pressure, and inflammation.

Perimetric studies

Although visual fields are undoubtedly an exceedingly important contribution toward the localization of intracranial pathology, no significant visual-field findings were noted in our series. The procedure is often difficult in children, but every effort should be made to obtain coöperation.

Summary

In a study of 42 cases of intracranial disease in children and juveniles the fol-

lowing findings were noted:

1. Changes in the optic discs were found in 95.2 percent of cases; this fact emphasizes the importance of an ophthalmoscopic examination in all children with findings which might in any way lead to a suspicion of intracranial disease.

2. Loss of vision was registered as a complaint in only 23.8 percent of the cases in spite of the fact that 95.2 percent of the cases presented abnormalities of the optic discs. This is due to the fact that children do not appreciate failure of vision so readily as do adults, and that choked discs do not affect the vision for some time.

3. Nystagmus was present in 21.4 percent of the patients, all of whom had tumor of the brain and, with one exception, occurred with a tumor of the cerebellum.

4. Of the total number of patients in this series, 55 percent had brain tumors. Histological verification was possible in all except two cases, in which the cerebellar lesion was seen at the time of decompression. The optic discs were normal in only one case, a subtentorial lesion.

5. A case of high-cervical-cord tumor associated with bilateral choked discs is reported, and a short review of the literature pertaining thereto is cited.

6. This study emphasizes the extreme importance of a thorough ocular examination. The omission of a fundus examination is often the reason for failure in reaching a correct diagnosis; this is especially true in the case of children, in whom other examinations may be difficult.

TABLE 1

DIAGNOSIS

Verified: (31 cases)

23 brain tumors:
- (a) 11 supratentorial lesions:
  - 3 glioblastoma
  - 2 astrocytoma, atypical
  - 1 undifferentiated tumor
  - 1 ependymoma, cystic
  - 1 polar spongioblastoma
  - 1 ependymoma, atypical
  - 1 oligodendroblastoma
  - 1 hypophyseal-duct tumor (adamantine type)
- (b) 12 subtentorial lesions:
  - 7 astrocytoma
  - 3 medulloblastoma
  - 2 cerebellar (lesions seen grossly at time of decompression)

4 brain abscesses
1 encephalomalacia, left frontal lobe
1 traumatic cyst, left frontal lobe
1 cord tumor, ependymoma
1 arteriolar hypertension

Clinical: (6 cases)

2 pituitary tumors
1 hemorrhagic purpura
1 encephalitis, post-meningococcic meningitis
1 scaphocephaly
1 oxycephaly

Diagnosis undetermined: (5 cases)

TABLE 2

OCULAR SYMPTOMS AND SIGNS IN 42 CASES OF INTRACRANIAL LESIONS IN CHILDREN

	Percent
Changes in the optic papillae (40 cases) . Choked discs or postpapillitic atrophy, 37 cases; optic atrophy, primary or secondary? 2 cases; neuroretinitis, 1 case.	95.2
Extraocular muscle palsies (12 cases) .. Unilateral lateral-rectus palsy, 7 cases; bilateral lateral-rectus palsy, 4 cases; right superior-oblique palsy, 1 case.	28.6
Poor vision (10 cases)	23.8
Nystagmus (9 cases)	21.4
Diplopia (4 cases)	9.5

TABLE 3

OCULAR FINDINGS IN 23 CASES OF TUMOR OF THE BRAIN IN CHILDREN

	Percent
Changes in the optic papillae (22 cases) Choked disc or postpapillitic atrophy, 21 cases; optic atrophy, primary or secondary? 1 case.	96
Nystagmus (9 cases)	39
Extraocular-muscle palsies (9 cases) .... Unilateral lateral-rectus palsy, 5 cases; bilateral lateral-rectus palsy, 3 cases; right superior-oblique palsy, 1 case.	39
Poor vision (6 cases)	26
Diplopia (3 cases)	13

TABLE 4

OCULAR FINDINGS IN SUPRATENTORIAL TUMORS OF THE BRAIN (11 CASES)

(Ages 3 to 18 years inclusive)

	Percent
Changes in the optic papillae (11 cases)	100
Choked discs or postpapillitic atrophy, 10 cases; optic atrophy, primary or secondary? 1 case.	
Unilateral lateral rectus palsy (2 cases)	18
Nystagmus (1 case)	9
Poor vision (1 case)	9

TABLE 5

OCULAR FINDINGS IN SUBTENTORIAL TUMORS OF THE BRAIN (12 CASES)

(Ages 4 to 13 years inclusive, except one of 18 years)

	Percent
Changes in the optic papillae (11 cases)	92
Choked discs or postpapillitic atrophy.	
Nystagmus (8 cases)	67
Extraocular muscle palsies (7 cases)	58
Unilateral lateral rectus palsy, 3 cases; bilateral lateral rectus palsy, 3 cases; right superior oblique palsy, 1 case.	
Poor vision (5 cases)	42

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ANIRIDIA CONGENITA, IRIDEREMIA

Report of cases extending through five generations*

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Aniridia, or congenital absence of the iris, is an interesting hereditary ocular defect. The hereditary tendency reveals itself more prominently in aniridia than in any other congenital malformation of the eye.[1] No intelligent explanation has been advanced to show why this is so. Seldom, if ever, is there a complete absence of iris, for anatomical sections reveal the presence of tags or remnants of iris tissue; but when no iris can be seen clinically, the condition is spoken of as complete aniridia. It may be looked upon as a total coloboma of the iris.

Aniridia is practically always bilateral. However, unilateral cases have been reported by Brunhuber[2] and Tokkus.[3] Aniridia of one eye and coloboma of the other is probably the most frequent type seen. On inspection, the appearance of an aniridic eye is striking and characteristic. Where the normal iris should be, there is nothing but blackness; unless more or less remnants of iris can be seen. Upon closer inspection, conical or microcornea may be found, and opacities of the cornea are frequent accompaniments. However, it is not always possible to determine if opacities of the cornea are congenital, or acquired. The anterior chamber is usually of normal depth; but may appear deep on account of the absence of the iris, or it may appear shallow if the lens is dislocated forward. Ectopia lentis rather frequently accompanies aniridia, and the lens may be displaced in any position. This can possibly be accounted for by the faulty development of the ciliary body and the suspensory ligament. The lens, if clear, has a grayish reflex with a red fundus reflex around its circular border. The fibers of the suspensory ligament can be seen extending from the margin of the lens to the ciliary body. However, there is often more or less opacity of the crystalline lens; anterior and posterior cataracts are frequent, while cortical and lamellar opacities are less so. While these opacities may be either congenital or acquired, they usually increase with age until the entire lens becomes opaque. Remnants of the hyaloid system, scanty pigmentation, and malformations are seen in the fundus. Various other congenital and pathological conditions may accompany aniridia.

Seefelder,[4] who made a histological examination of the retina, found a failure of the differentiation in the region of the macula and thought this accounted for the nystagmus and amblyopia which are so frequently present in aniridia.

The facial expression in aniridia is rather characteristic, due to the effort of the patient to exclude light—the brow is corrugated and the palpebral fissure is voluntarily narrowed to avoid photophobia. The vision is usually greatly reduced. The history is that sight has been poor since childhood. The large inactive pupil, admitting a great amount of light, produces a dazzling and lack of definition. This, together with opacity of the cornea and lens and the mal-development in the macula, is sufficient to account for the amblyopia so frequently present in aniridia.

Glaucoma as a secondary complication is not uncommon. It has been contended that ectopia lentis may account for this —but glaucoma following the extraction of cataract cannot be explained on this

*From president's address, Western Ophthalmological Society, annual meeting, Denver, July 22, 1937.

basis. Faulty development of the iritic angle is the more likely cause of the glaucoma. An interesting point noticed by Dennis,[5] and previously mentioned by Scalinci,[6] was the fact that eserine invariably reduces tension in aniridia. Formerly it was thought that reduction of tension was due to miosis, but the absence of the iris to contract and the lack of normal ciliary processes to produce aqueous make it necessary to find a reaction other than miosis to account for the reduction of intraocular tension by eserine. Dennis suggests that tension is probably lowered by reason of the well-known power of eserine to contract blood vessels.

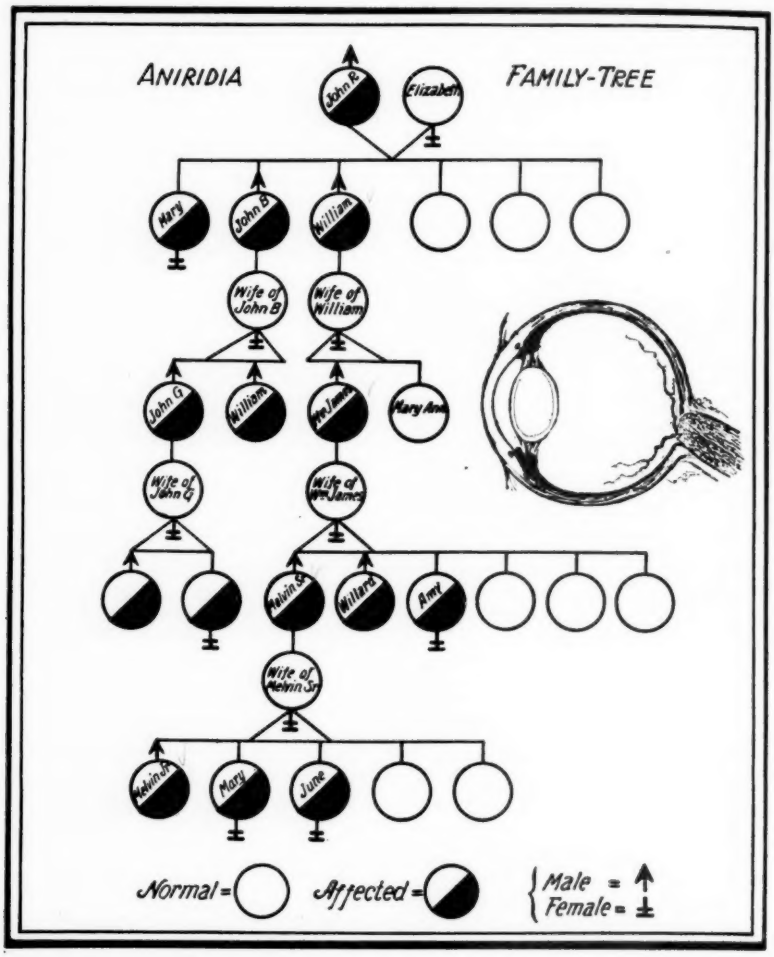

Fig. 1 (Neher). Family tree showing five generations of inherited aniridia.

Case histories

No record could be obtained of the first subject in this series of aniridia, John A., a native of England. Six children were born to the union of John A. and Elizabeth, three of whom, a daughter, Mary, and two sons, John B. and William, inherited aniridia. The other three children had normal irides. Mary died at the age of 20, unmarried. The number of children in John B.'s family is not known, but two

sons, John C. and William, are known to have had aniridia. Nothing is known of William's history. It is not known how many were in John C.'s family, but it is stated he had a son and a daughter who inherited aniridia. Later cataracts developed and were removed in San Francisco, with unknown results.

Second generation. William, the youngest son of John A., was a resident of Salt Lake City until his death at the age of 90 years. His vision was defective from the time of his birth and became worse when he developed cataract in one eye at the age of 55, and in the second eye 10 years later. One cataract was successfully removed, with sufficient improvement in his sight to permit his employment in the city street department.

His brow was corrugated and the palpebral fissure voluntarily narrowed to combat photophobia; the cornea had a diffuse faint gray appearance, making it slightly opaque; the iris consisted of a small narrow blue band, about 1½ mm. wide—the right lens was missing and the other opaque.

He had an unmarried daughter, Mary Ann, whose eyes were normal, and a son, William James, who inherited aniridia.

Third generation. William James, aged 67 years, a mechanic was first seen in the office in August, 1930, complaining of gradual loss of vision in the right eye for the past two years. He gave the history of never having seen very well, and further stated that two of his sons and a daughter had an eye defect similar to his own. The remaining three children have normal eyes.

Examination revealed a medium-sized man with corrugated brow and voluntarily narrowed palpebral fissures, although the patient stated his eyes were not sensitive to light. Vision in the R.E. was reduced to the ability to see hand movements at 2 feet, light perception and projection being good; in the L.E. 20/200 unaided, but with + 4.00 D. sph. ⊂⊃ + 0.50 D. cyl. ax. 180° it was 20/50—1. Both the bulbar and palpebral conjunctivae were normal. The corneae were hazy gray, but normal in size and shape.

In the right eye, there was a small band of blue iris about 1½ mm. wide, above and on the sides, while below it could scarcely be seen at all. The margin of the iris was covered with a heavy brown pigment. The lens was quite swollen and opaque and appeared to be displaced forward, nearly completely filling the anterior chamber.

In the left eye, the blue iris was wider, about 2 mm. wide above and on the sides, with a small coloboma below. A layer of dark-brown pigment covered the iris around the margin of the coloboma, which made it appear larger except on close inspection.

The patient was not seen again until March, 1936. He stated that vision in both eyes had grown worse. One leg was afflicted with neuritis, which required the constant use of sedative drugs.

The facial expression observed in the former examination was more marked, yet he made no complaint of photophobia. The right eye diverged about 20 degrees. The corneae were normal in size and shape, and showed a faint gray haze. The right lens was hypermature, with a grayish-brown nucleus gravitating around in the white liquid lens. With the head tilted forward, the nucleus could be plainly seen, while it disappeared in the milky fluid when the head was tilted backward. The left lens had become more opaque, but the patient could still see 20/200 with this eye. He desired to have the cataract removed from his right eye. He was advised, however, to get rid of his neuritis and drug habit, before any attempt should be made to remove the cataract. This he did, and an intracapsular extraction was

performed on the right eye in February, 1937. The eye made an uneventful recovery. With a +14.00 D. sph. ⊂⊃ +2.50 D. cyl. ax. 100° he was able to see 20/40, and with a +3.00 D. sph. added in a reversible frame, the patient read .50D. on the Jaeger chart. A very grateful patient has returned to his work, as mechanic in the Salt Lake City street department.

This patient has no nystagmus—the divergence developed with the amblyopia due to the cataract of the right lens. Aside from scanty pigmentation, the right fundus is normal.

Fourth generation. Amy, aged 37 years, is hypersensitive about her eye condition and will not permit an examination. Her parents gave the history of defective vision since birth and the later development of cataracts. She had an unsuccessful cataract operation in one eye 10 years ago. For the past five years she has used liquid honey in her other eye, and claims the vision is improving. This product is sold by the Rocky Mountain Honey Company. They claim the bees obtain it from a special flower grown in the Utah mountains, and that it is beneficial in absorbing cataracts.

Willard, single, aged 31 years, a laborer, gave a history of defective vision since childhood. His general appearance is normal, without strabismus or nystagmus. Vision in each eye is 20/200. Glasses failed to improve the vision.

He had some photophobia and wore amber-colored goggles. The lids and corneae were normal. The right iris was very narrow—about 1 mm. wide. This made the pupil appear very large. The right crystalline lens had a small opacity, located in the anterior part of the cortex; the fibers of the suspensory ligament were not seen. Except for scanty pigmentation, the normal fundus could be seen distinctly with the ophthalmoscope.

The left iris was narrower than the right, the margin of the iris being only 0.5 mm. wide. The circumference of the lens could be plainly seen. The posterior part of cortex was quite opaque, which obscured the view of the fundus.

Melvin, Sr., married, aged 40 years, is an employee of an oil company. He is the father of five children. Two girls, Mary and June, and one boy, Melvin, Jr., have inherited the aniridia. The remaining two children have normal irides.

Melvin, Sr., gave the usual history of defective vision since birth. On casual examination his facial expression was normal—no nystagmus, no strabismus. Vision in the R.E. was 20/200, improved to 20/40 with a +4.50 D. sph. ⊂⊃ +1.50 D. cyl. ax. 105°; in the L.E. 18/200, improved to 20/200 with a +4.50 D. sph. ⊂⊃ +2.75 D. cyl. ax. 30°.

The eyelids and corneae were normal. The anterior chamber appeared to be deep, especially in the right eye, where there was less iris than in the left. In the right eye no iris was visible, except a small band from 0.5 to 1 mm. wide in the upper temporal field. The edge of the lens could be distinctly seen, but the ciliary body was not visible. The left iris had a more normal appearance except for a small coloboma below and temporalward. The iris around the coloboma was covered with grayish-brown pigment.

The lens was normal in shape and size, but not entirely transparent. A small white spot, about 1 mm. in diameter, was located on the anterior surface of the cortex, and a larger opacity with less distinct outline on the posterior surface. The lens between the two opacities was clear. The fundus with scanty pigmentation could be seen around the opaque spots in the lens. The vitreous, disc, and retinal vessels were normal. No pathology was seen in the retina or choroid.

Fifth generation. Melvin, Jr., aged 12 years, a school boy in the 7th grade, was

normal as to general appearance and expression. There was no strabismus and no nystagmus. Vision in the R.E. was 20/40, with glasses 20/40+1; in the L.E. 20/50—1, unimproved with glasses.

The eyelids and corneae were normal. The anterior chamber was normal in depth. The right iris had a normal appearance, except for a small band of the lead-brown pigment at the lower margin of a normal-sized pupil. The left iris had a small coloboma below, with the lead-brown pigment on the iris at the margin. This gave the pupil an oval shape. The lenses were normal and no pathology was seen in the retina or choroid, other than lack of normal pigmentation.

June, aged six years, had the appearance of a normal child with no strabismus and no nystagmus. The vision in the right eye was 20/70, and in the left 20/50, using the illiterate chart. She had never worn glasses.

The eyelids and corneae were normal. The anterior chambers appeared deep, since no iris could be seen in either eye. However, there was sky-blue color beneath the limbus, which could be a remnant of the iris. The pupil appeared even larger than the cornea.

The margin of a clear lens and the suspensory fibers extending from its entire circumference could be plainly seen. The ciliary body was not definitely visible. The fundus could be clearly seen; the outline of disc was clear and distinct; the retinal vessels were normal in course and relation, the very scanty pigment in retina and the choroidal vessels plainly visible.

Mary, single, aged 16 years, a high-school student, gave a history of nonprogressive defective vision since birth. Her appearance and expression were those of a normal high-school girl with no strabismus and no nystagmus. Vision in the right eye was 20/50—1, and 20/70+2 in the left eye. It was improved to 20/40—2 in each eye with a —2.00 D. sph. ⊂ —2.50 D. cyl. ax. 180° for each eye.

The eyelids and corneae were normal. The anterior chamber appeared to be deep, owing to the lack of iris which consisted of a very small band, less than 0.5 mm. wide, located beneath the margin of the limbus. Thus the pupil appeared to be approximately the size of the cornea.

The lens was clear, normal in position, size, and shape. The fibers of the suspensory ligament could be clearly seen. The vitreous was clear; the outline of the disc could be seen distinctly; the retinal vessels were normal in course and relation; the pigment in the fundus was very scanty, bordering on the condition found in an albino eye. Aside from scanty retinal pigment, the fundus was normal.

Discussion

Nearly a score of different theories[7] have been advanced to explain aniridia, none of which seem to be beyond question. Most of the evidence points to its being the result of a congenital defect in development rather than a destruction due to intrauterine inflammation. Whatever explanation is accepted for congenital iris coloboma can be equally well used to explain aniridia. This being true, the theory of Hess[8] as applied to atypical coloboma of the iris, also supported by Coats,[9] must receive consideration. In this theory cognizance is taken of the fact that mesodermic tissue passes forward normally around the equator of the lens to join the anterior mesodermal ingrowth, not only in the region of the fetal cleft, but in all directions. Its presence is normal, and it gives way to the iris as the latter grows in from all sides, offering no resistance except where the mesoderm is hyperdeveloped or possibly overvascularized. Should only a strand of tissue be thus affected, a coloboma is formed. If the whole tissue is hyperresistant, the iris cannot grow as

it normally does and aniridia results. A similar theory is expressed by Ida C. Mann:[10]

"In a discourse on congenital defects of the iris mention must be made of *aniridia,* since it is a condition of total coloboma of the iris. Sir John Parsons says:[11] 'It is obvious that any cause leading to arrest of development of the iris at any one point will account for an iris coloboma, and that the same cause acting simultaneously round the whole circle will account for aniridia.'

"A study of the normal development of the anterior segment of the eye will furnish a possible common cause for all these conditions; the main factor in the production of colobomata of the iris appears to be the abnormally long persistence of one, several, or all of the vessels which normally connect the *circulus arteriosis iridis major* with the terminal branches of the hyaloid vessel around the edge of the optic cup. These vessels I have called irido-hyaloid vessels. They appear at the fifth week in man, and begin to disappear at the middle of the third month, when the ectodermal part of the iris is starting to grow forward over the front of the lens."

Summary

The part of the aniridic family tree upon which accurate data could be obtained has verified the Mendelian inheritance law;[12] that is, one half of the offspring possess the dominant character—aniridia—while the other half possess a normal iris. Furthermore, when the aniridic offspring are mated with normal individuals and have children, 50 percent are aniridic and the remainder have a normal iris; but the normal offspring who marry normal individuals never have borne children with aniridia. The amount of iris present varies from complete aniridia to a small coloboma of the iris.

Boston Building.

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NOTES, CASES, INSTRUMENTS

TECHNIQUE OF USING THE FLUORESCENT LAMP IN CATARACT SURGERY

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Perhaps foremost among the advantages gained by the use of the fluorescent lamp in cataract surgery is the visibility given to the lens surface when the lens capsule is grasped. As one becomes accustomed to seeing and adjusting the extent of the "bite" of the capsule forceps, sureness and accuracy follow. When attempting this step later, with white light alone, the surgeon will be surprised at the inadequacy of his perception, and the grasp becomes a less certain procedure. Someone has stated that one of the first principles of good surgery is to see what one is doing.

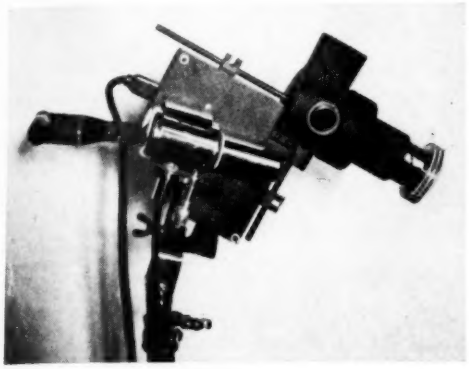

Fig. 1 (Hildreth). Fluorescent lamp in combination with operating spotlight.

In order to give to the lens this visibility (which can be attained in no other way than by fluorescence) the lamp must be used at its maximum efficiency. Unfortunately, the carbon arc must be the source of energy, since no other form of light yet available approaches the needed strength. Further, the light must be at least a 4½-ampere arc. Smaller arc lamps, such as are frequently used in laboratories, when adapted with a filter fail to give the required intensity.

Another requirement is proper adjustment of the carbons. The tips should be about one-eighth inch apart. The vertical tip should just reach the lower edge of the horizontal carbon, so as not to obstruct light from the tip of the horizontal carbon, which is the major source of light. If possible, one should use direct current and should be certain that the polarity is such that the horizontal tip is the brighter. If not, the wall-plug connection should be reversed. Direct current furnished a light stronger than alternating current by 30 to 40 percent; but the adjustment of the carbons will also alter the output by as much as 30 percent.

Since intensity of radiation is the deciding factor in the successful use of the fluorescent lamp, it naturally follows that the lamp must be focused carefully on the pupil. The point of focus is about 8 inches from the end of the lamp. The stand should be brought to this distance from the patient, and the lamp aimed slightly downward. An adequate handle is now attached to the back, so that the beam can be constantly focused on the cataract. The stand merely supports the weight of the instrument, which is too cumbersome to hold in the hand.

As has been indicated, the fluorescent lamp is to be in use only during the actual extraction of the lens. The section, iridectomy, placing of sutures, and the like, are best done under white light. In order to combine the two forms of illumination and place them most conveniently under the control of the surgeon, a Bausch and Lomb operating spotlight has been attached to the fluorescent lamp, giving a "double-barreled" light. The white light is used until the moment

of extraction. At this point the arc is turned on. A foot switch, operated by the surgeon or assistant, is very convenient for controlling the white light, for sometimes during the extraction or immediately after delivery of the lens the white light is momentarily desirable.

The addition of the fluorescent lamp does tend to crowd the operating room and add to the complexity of the cataract operation, and for this reason some will prefer not to use it. But when the lamp is used properly, a refinement is given to cataract surgery which inevitably improves results. Those interested should be careful to follow the foregoing suggestions, so that the lens glow is really adequate to give the improved visibility.

823 Metropolitan Building.

A SIMPLE SET-UP FOR EXTERNAL-EYE PHOTOGRAPHY

WILLIS S. KNIGHTON, M.D.
New York

Unless special provision is made, photography of the eye is usually a nuisance in the office because of the difficulty in setting up the camera, lights, and so forth. The following arrangement is presented as a simple expedient for the ophthalmologist who has a slitlamp.

I use a Leica camera with the copying attachment, and a Bausch and Lomb slitlamp, but other suitable instruments could undoubtedly be adapted in the same manner.

The camera is mounted on an extra ratchet carrier (B)* which acts as the base-plate of the microscope head. With the Leica a block of wood (C) had to be inserted between the carrier and the copying attachment (D) in order to bring the camera on a level with the patient's eye.

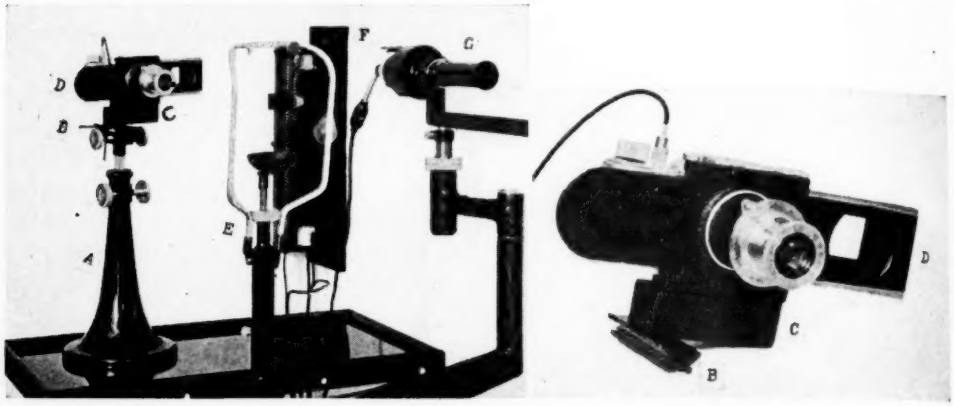

Fig. 1 (Knighton). A—microscope stand; B—ratchet carrier; C—wood block; D—copying attachment; E—chin and head rest; F—rheostat and bulb; G—slitlamp.

When the camera is to be used, the microscope head with the original ratchet carrier is slipped off the base and the copying attachment is slipped on. An ordinary bulb hangs over the rheostat (F) for slitlamp work, but this is replaced with a photo-flood or photo-flash for photography. Details of lens aperture and exposure are left to the individual, but in general it will be found that a fast lens is necessary.

40 East Sixty-first Street.

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*The ratchet carrier was obtained from Clairmont and Nichols, Opticians, New York City, who also fitted the wooden block to the copying attachment. The total cost was less than seven dollars.

SOCIETY PROCEEDINGS

Edited by Dr. H. Rommel Hildreth

COLORADO OPHTHALMOLOGICAL SOCIETY

March 20, 1937

Dr. W. T. Brinton, *presiding*

Uveitis with progressive infiltration of the cornea

Dr. Charles Walker, Jr., presented Mrs. H., aged 73 years, who was first seen on February 15, 1937, because of failing vision of the left eye, of two months' duration. She gave a history of having had an adenomatous cyst of the ovary removed 12 years previously. She has arteriosclerosis and leg ulcers. Examination showed the right eye to be normal, with a vision of 20/30. The vision of the left eye was 20/300. The left eye showed marked circumcorneal injection and there was infiltration of the cornea from the temporal side with deep and superficial new-vessel formation. Urinalysis and Wassermann tests were normal.

The eye was treated locally with 1-percent atropine and moist heat. Cod-liver oil and potassium iodide were prescribed. The infiltration of the cornea has continued to progress until almost the entire cornea is now involved.

Discussion. Dr. W. H. Crisp recommended the use of X-ray treatment, an erythema dose repeated several times.

Dr. M. E. Marcove expressed the opinion that this is a sclerosing keratitis.

Contre-coup injury to macula by contusion

Dr. Ralph W. Danielson presented a 42-year-old man who, 10 days previously, while chopping wood, was struck with a piece in the right eye, producing an abrasion of the cornea and some hemorrhage into the anterior chamber. After a few days, when the blood in the anterior chamber had been absorbed, the man complained that he had a spot in the center of his vision. A round, red area in the macula which gave the impression of blood, yet not exactly so, was then seen. Below this was a small rupture of the choroid, indicated by a white line. A visual-field test showed a definite, absolute central scotoma. There seemed to be no tendency to improvement in the sight, vision being less than 0.1.

This case was presented as an interesting result of a contusion and also for any suggestions regarding diagnosis and prognosis.

Discussion. Dr. G. H. Stine expressed the opinion that this is a case of hemorrhage in the macula which will develop into a macular hole. He referred to a case which he had recently seen in which the internal limiting membrane prevented a hemorrhage from affecting the fovea, although there was hemorrhage extending completely around the macula.

Dr. W. T. Brinton said that he believed that there is already a hole in the macula.

Dr. G. H. Hopkins mentioned a case of contusion in which there was a definite ring scotoma.

Dr. W. H. Crisp recommended the use of pilocarpine in cases where there is a massive hemorrhage into the anterior chamber. He has found that pilocarpine promotes rapid absorption of the hemorrhage and prevents high tension. He avoids the use of atropine in these cases entirely.

Melanoma of the choroid

Dr. L. L. Davis showed the gross specimen and microscopic sections of the

case of acute glaucoma presented before the Society by Dr. Harry Shankel in January, 1937. The eye contained an extensive melanoma of the choroid.

Edna M. Reynolds,
Secretary.

ROYAL SOCIETY OF MEDICINE, LONDON

Section of ophthalmology

March 12, 1937

Mr. W. H. McMullen, *president*

Transitory tremulous lens

Mr. Davenport read an abstract of a paper by Dr. M. E. Alvaro (São Paulo, Brazil). The patient, a man aged 29 years, when first seen had uveitis in his left eye. Two previous attacks were regarded and treated as of luetic origin, although the Wassermann test was negative. Right vision was reduced to the ability to count fingers at three feet. There was a good deal of exudate in the aqueous and the vitreous. In the right eye there was slight hypotension as compared with its fellow. Protein was injected intramuscularly, and atropine prescribed. Several foci of dental sepsis were revealed by X-ray examination. No tuberculosis nor septic foci were discovered. The dental foci were removed, and after six injections of protein both aqueous and vitreous began to clear. Vitamins A and D with calcium were prescribed, and vision gradually improved to 6/60. Seven weeks after the first examination, however, the condition suddenly relapsed, and vision was no more than perception of light, and both aqueous and vitreous were almost opaque with exudates. At that time iridodonesis and tremor of the lens could easily be seen. This tremor increased during the next few days, and thereafter gradually decreased, disappearing entirely nine weeks after it was first seen. Vision gradually improved to 6/36. Five weeks later the vision of the eye decreased suddenly, and a large retinal detachment was found. Safar's operation was carried out, with good results. Seven months after the operation the retina remained completely reattached, and vision had improved to 6/12. The fluidity of the vitreous might have caused the lens to be tremulous, as D'Ombrain has suggested. In both the latter's case and this one the intraocular tension was lower than normal. In this case there must have been some other cause for the marked tremor of lens and iris; possibly it was a sequel to the inflammation of the chorioretinal tract.

Congruous field defects due to congenital abscence of nerve fibers

Mr. G. G. Penman said that in his patient, an infant aged one year, the absence of the upper central part of the field of vision had been only recently noticed. Vision in the right eye was 6/36, not improved; in the left eye 6/6. There were practically congruous field defects extending from the optic discs over the upper nasal and part of the upper temporal quadrants. The case presented no evidence of past intraocular disease. There were symmetrical pits in the lower part of both optic discs, associated with pigment proliferation. The neurological examination revealed nothing of a pathological nature.

Discussion. Mr. Eugene Wolff said that Mr. Hayne had suggested to him that this might be similar to a case which the speaker showed before the Ophthalmological Society at its meeting in Edinburgh in 1931. He there suggested that the most common cause of recurrent proptosis was lymphangiomata of the orbit, or cystic hygromata of the orbit, characterized by the fact that the patients were liable to recurrent attacks of inflammation. Possibly this might be a case of cystic lymph-

angioma, as in this condition the proptosis might come on in a few hours.

Choroidal growth

Mr. T. E. Davies presented the case of a woman who came for a test of refraction; she read 6/6 with each eye. On looking at the retina he was surprised to see a raised black mass to the outer side of the macula. He had thought it might be a subchoroidal hemorrhage, but subsequently reflected that it was elevated too much to be due to a hemorrhage. The iris was clear. The change in the last month consisted of an increase in the size of the growth. There had been some macular edema in the past few weeks. The Wassermann test was negative.

Discussion. Mr. C. Goulden said that the mass was apparently walled; there were no changes in the vitreous. The blood vessels had passed through the mass. He believed this to be sarcomatous.

Mr. W. H. McMullen agreed to the diagnosis of sarcoma and was of the opinion that one was not justified in allowing this patient to retain the eye in view of this very definite possibility. From the point of view of her life the eye should be removed, unless radium could be tried after the method advocated by Mr. Foster Moore, with a prospect of success.

Avulsion of part of upper lid

Mr. G. G. Penman said he had done his best to reconstruct the outer part of the upper lid, where the chief damage was done; the other part needed only a tag of skin to be brought down. He did not see the case until 24 hours after the injury, and it was then too late to make a primary reattachment.

Discussion. Mr. D. V. Giri said that five years ago he had treated a boy who, while working in a garage, was struck on the lid by a hook. When examined one-half hour after the accident the lid was hanging by only a thread of tissue. The speaker carefully brought the damaged tissue into apposition and stitched the lid, and it healed up wonderfully, so that in a fortnight's time one could not see that anything had been the matter with the eyelid. It had regained its function completely although he had expected to find some ptosis resulting.

(Reported by H. Dickinson.)

SAINT LOUIS OPHTHALMIC SOCIETY

March 26, 1937

Dr. Lawrence T. Post, *president*

Surgical miscellany

Dr. John Green read a paper on the following four topics: 1. Excision of chalazion sac from conjunctival side; 2. Buccal-mucous-membrane transplant in recurrent pterygium; 3. Recession and advancement: technique of Dr. R. J. McCurdy; 4. Improved technique for combined cyclodialysis and iridectomy with demonstration of a pendulum scalpel. Topics 1 and 2 were published in this Journal (June and Sept., 1937, respectively).

Discussion. Dr. Carl Beisbarth said that there are two types of chalazia that require special handling; one is the marginal chalazion which leaves a red lump when incised and curetted. In these cases he has found that a shallow "V" in the lid margin leaves a smooth edge. A second type is the chalazion in the extreme outer margin of the upper lid. These are best handled by incision and curetting.

Dr. F. O. Schwartz said that for a number of years he has been dissecting chalazia. If an incision is made around the base of the chalazion, there is less difficulty in its removal.

Dr. William M. James said that he has

had difficulty in handling the marginal chalazion when removed through the skin surface. By making a perforating wound through the tarsus in order to drain the space after the skin is closed, healing has been more satisfactory.

Dr. John Green said that his patient with the mucous-membrane graft had volunteered this evening for the first time that the eye with the graft felt equally comfortable as the fellow eye. Epidermal grafts were irritating to the conjunctiva because of the continual shedding of skin secretions.

In answer to Dr. Lawrence T. Post, he spoke of the difficulty in placing the sutures in the McCurdy advancement, saying that he felt it easier to place the sutures before the tendon is divided. He had never noticed any tendency to sloughing of the scleral sutures.

Sixth- and eighth-nerve paralysis following brain concussion

Dr. Roy Mason reported the case of W. G., aged 36 years, who was injured in a fall from a scaffold. There was a concussion of the brain and a questionable fracture at the base of the skull. As the patient regained consciousness, the left eye was found to be turned in, hearing was lost in the left ear, and the semicircular canals on the left side were not functioning. The sixth nerve was completely paralyzed, but was partly restored in six months. A settlement was made on this basis but two years later the paralysis had completely disappeared. The state of the eighth nerve is not known.

Choroidal detachment after corneoscleral trephining

Dr. Daniel Bisno said that since the publication of recent articles by O'Brien on the frequency of postoperative detachment of the choroid following cataract extraction, detachments following other types of intraocular operations have taken on added interest. A survey of the literature describing this complication after corneoscleral trephining reveals only a few articles, although it is probably not so rare as one would gather from the number of cases reported.

Concerning postoperative detachment of the choroid, we owe the first clinical description to Graefe, the first clinical and post-mortem examination to Herman Knapp, and the first classical monograph on the subject to Fuchs in 1900, in which he mentioned that only 10 cases had been reported since Knapp's case in 1868.

Schur in 1913 made the first reference to choroidal detachment in Elliot's trephining operation, this being closely followed by Paderstein's article. Since then, only occasional reports concerning it have been published.

Mrs. S. H., aged 73 years, was first seen at the County Hospital, November 5, 1936, when she complained of failing vision in each eye for the past two years. Vision in the right eye was 15/200 and in the left the ability to see hand movements at one foot. Examination revealed glaucomatous cupping and atrophy, more marked in the left eye. The tension was 58 mm. Hg (Schiötz) in each eye. Peripheral fields revealed generalized constriction with the nasal step to a one-degree white target in the right eye, and only a small temporal field to a 10-mm. white target in the left eye. Tension was reduced only moderately with pilocarpine. The patient was admitted to the County Hospital, November 10, 1936. A corneoscleral trephining with a peripheral iridectomy was performed on the left eye. The entire postoperative course was uneventful; the tension remained around 18 mm. Hg. The right eye was similarly trephined November 16, 1936. There were no complications during the operation. The day following the operation the anterior chamber had re-

formed and the eye was quiet. The fundus was not examined. The second postoperative day the anterior chamber was extremely shallow and there was a small hemorrhage on the lower pupillary border. On the third postoperative day the anterior chamber continued to be shallow and a fistula of the conjunctiva was sought with fluorescein but not found. Examination with the ophthalmoscope revealed a small choroidal detachment in the extreme nasal periphery. Two days later the anterior chamber was still abolished, and there were large typical detachments of the choroid in the lower-nasal, upper-nasal, and upper-temporal areas of the peripheral fundus. The tension during this period remained very low to palpation. No marked change took place until November 30th, two weeks after the operation, when the anterior chamber was found to have been restored to almost normal depth and the choroidal detachments were less extensive than they had previously been. The anterior chamber continued to be of normal depth from that time on, although it was six days after the restoration of the anterior chamber before the choroid finally was in its normal position. On discharge, the tension was 17 mm. in each eye, there was a small conjunctival bleb over the trephine opening, and the fields were the same as they had been previous to operation.

A study of the incidence of this complication after trephining results in great discrepancies between the various authors. In the discussion of Barkan's article in 1915 there were a few ophthalmologists with extensive clinical material who had never seen a case, while Hagen, using a special method of transillumination to detect the smaller separations not visible ophthalmoscopically, believed that he could demonstrate a separation in 76 percent after the trephining operation. Hans Barkan had 9 percent of his trephine cases show choroidal detachment, Rupert 42 percent, Ernst Fuchs 5 percent, and Meller 7 percent. Barkan stated that choroidal detachment occurred in from 10 to 20 percent of glaucoma operations.

Postoperative choroidal detachment ordinarily occurs within eight days after operation, and usually disappears within a month. Rarely does it persist longer, though several cases have been reported with a duration up to six months. The anterior chamber is abolished, and remains so for the duration of the detachment, the tension being very low. The detached choroid appears as a dark grayish orange globular elevation in the peripheral portions of the fundus. It is usually composed of several rounded adjoining elevations with deep creases between them, the creases supposedly due to attachment of the choroid at these points to the sclera by the vorticose veins and other vascular attachments of the choroid to the sclera. Usually within a few days the wound closes, the intraocular pressure rises, and the anterior chamber is re-formed. After this happens and after the intraocular pressure becomes normal, the separation may persist for a few days or weeks, then gradually the intraocular pressure forces the fluid out of the suprachoroidal space or causes it to be absorbed. Occasionally the closing of the wound is followed by an attack of acute glaucoma, as in two of Fuchs's cases; in Derby's case the tension rose above normal to be reduced later by the use of pilocarpine.

There have been several theories advanced for this complication after intraocular operations. Fuchs believed that there was a tear of the pectinate ligament with aqueous entering the suprachoroidal space through the tear and detaching the choroid. Meller considered that aqueous was secreted in greatly increased quantities after the operation and felt that under certain conditions, possibly due to

nonrupture of the ciliary epithelium, some of the aqueous forced its way back through the ciliary body directly beneath the choroid. The most commonly accepted theory is that of Hudson who believed that the serous exudate arises from the choroidal blood vessels, particularly from the thin-walled choroidal veins. Under conditions of abnormally low tension, an abnormally free transudate of fluid from these vessels occurs which again stops when the tension is reëstablished. Meller asserted that the eye is not soft because of the choroidal detachment but because there is a leaking spot in the eye, the choroidal detachment taking place only because the eye has become soft. With the establishment of normal tension the choroidal detachment disappears. Heine's operation for cyclodialysis offers a striking refutation of Fuchs's theory of rupture of the pectinate ligament. In his many cases Heine observed choroidal detachment only once. Rigidity of the sclera, as suggested by Meller, undoubtedly increases the likelihood of postoperative separation, since it tends to prevent collapse of the sclera and allows the intrachoroidal pressure to become less than in cases of normal sclera. Wilder has suggested that postoperative detachment of the choroid should be explained on anatomical peculiarities in which the choroid is not so firmly attached to the sclera.

Two conditions should be ruled out in studying a case of this type: detachment due to neoplasm of the choroid and retinal detachment. Transillumination and a study of the tension will eliminate the possibility of a choroidal sarcoma or metastatic growth, while a retinal detachment has an entirely different appearance.

As a rule, no treatment is indicated except rest in bed. Attempts should be made with fluorescein to determine a conjunctival fistula, and if one is found attempts should be made to close it. Verhoeff has suggested in rare cases a scleral puncture to allow the subchoroidal fluid to escape. He states that in a very small percentage of cases the separation of the choroid persists indefinitely after closure of the wound, and explains this on the assumption that the intraocular tension even under ordinary conditions is unusually low in these eyes. After closure of the operative wound it does not become high enough to push the fluid out of the choroidal space.

The prognosis is usually good, although there have been a few cases in which the anterior chamber did not re-form and the eye was eventually lost. Occasionally there may be a second detachment of the choroid after the original has become reattached, as in Tillman's case in which the detachment persisted for five months after the operation, the first reattachment lasting 85 days. Then the second detachment took place and continued for 57 days with final restoration of the choroid to its normal appearance and with good field of vision in the area of the previous detachments.

Discussion. Dr. John Green said that Hans Barkan lists four classes of detachment of the choroid: 1. Tears of the ciliary body with aqueous percolating into the suprachoroidal space (Fuchs); 2. Traction on the choroid and retina by organizing masses in the vitreous; 3. Hemorrhage in and beneath the choroid from ruptured vessels; 4. Inflammatory detachment. Complete restoration to the state antedating the detachment is possible only in class one.

The paucity of cases in the literature in the latter half of the nineteenth century (Fuchs, writing in 1900, stated that only 10 cases had been reported since Herman Knapp's single case of 1868) is an index of the infrequency of ophthalmoscopic observations during recovery from intraocular operations.

Prior to Fuchs's study various theories were offered to explain the ophthalmoscopic appearance. Haab believed the proturbances to be cysts. Velhagen thought that they were cystlike detachments from the epithelium of the ciliary body. Lindeman believed the appearances were due to swollen and blood-stained cortical masses in the vitreous. None of these theories are accepted today.

These detachments are often transitory; they may occur very soon after operation and last for only one or two days. They have probably not been detected more often because of our unwillingness to use the ophthalmoscope during the first few days after operation for cataract or glaucoma.

Through the courtesy of Dr. Bisno, Dr. Green said, he had seen this patient about a week following the first observation of the detachment. At this time the condition was as described. Two detachments, dark gray in color, quite globular in shape, were on the nasal side and a single mass lay in the upper temporal area. Dr. Green was impressed with the sharply defined appearance of the projecting masses, the dark-gray color, and the absence of visible markings. The appearances were entirely different from a retinal detachment or a detachment due to tumor. His personal experience with choroidal detachment following scleral trephining is limited to three cases, in all of which reattachment was effected after various periods; hence, he felt optimistic about the eventual outcome in this case. The occurrence, however, was disconcerting, as the incident occurred in the only useful eye of the patient.

H. Rommel Hildreth,
Editor.

CHICAGO OPHTHALMOLOGICAL SOCIETY

April 19, 1937

Dr. G. Henry Mundt, *president*

Left central-retinal-artery embolism with recovery of vision following treatment

Dr. T. N. Zekman presented a 73-year-old man, first seen on March 29, 1937, with the history that the vision in the left eye had failed the previous morning. On the morning of examination he could see until about 10:00 a.m. when the vision again failed. Examination revealed a classic picture of embolus of the left central-retinal artery, with a cherry-red spot at the macula surrounded by white retinal edema. The veins were beaded, the arteries empty, white, and silvery in appearance. On the same day paracentesis of the cornea was performed following the inhalation of amyl-nitrite. Incision was made with a keratome at 270 degrees, a spatula was inserted and aqueous allowed to escape. The patient was kept in the hospital for two days. Vision in the left eye was light perception and projection. Tactile tension was normal, the anterior chamber was deep. The patient was kept under observation in the clinic, and at this time the vision in the left eye is 20/50; tension (Gradle-Schiötz) 14 mm. Hg. The vitreous is hazy, the veins and arteries are apparently full.

Some results of intranasal dacryocystorhinostomy

Dr. Theodore E. Walsh and Dr. Louis Bothman read a paper on this subject which was published in this Journal (September, 1937).

Discussion. Dr. Louis Bothman said that in 1920, Clifford Walker in an article in the Archives of Ophthalmology had stated "There are more rhinologists who are familiar with the use of the ophthal-

moscope than there are ophthalmologists who are willing to use the nasal speculum and the head mirror." Ophthalmologists still prefer the external route in treatment of dacryocystitis. Dr. Kaleff, head of the city hospital in Philippopel, Bulgaria, had an article in the February number of the Zeitschrift für Augenheilkunde dealing with an external operation, and H. Weve wrote on the same subject in the Klinische Monatsblätter für Augenheilkunde for the same month. Weve performed two types of operations. In one series he used the method of Dupuy-Dutemps, who sutures the nasal mucosa to the sac wall. In the other, he placed no sutures (Toti operation). The percentages of cures did not differ greatly, but were in favor of the operation in which the sutures were used, 97 to 90 percent. Arruga, who performed several operations while he was here, also used sutures. The external operation probably functions as well, but it leaves a scar and occasionally there is a flare-up of the dacryocystitis or cellulitis of the cheek, in which case a much worse scar may remain than would ordinarily be expected. As Dr. Walsh said, some patients who will not submit to an external operation, will submit to the intranasal one. Dr. Walsh's results have been excellent.

Some factors in the etiology of iritis

Dr. Lyman A. Copps (Marshfield, Wisconsin), read a paper on this subject which was published in the Wisconsin State Medical Journal (March, 1937).

Discussion. Dr. Michael Goldenburg did not wholly agree with the basis assumed for the diagnosis of tuberculous iritis. He could not accept the cutaneous tuberculin reaction as diagnostic after the fourth year, nor its specific therapeutic value in a proved case of tuberculosis. In a complete survey, made about six years ago, of the Municipal Tuberculosis Sanitarium, 1,073 pairs of eyes in proved cases of tuberculosis were examined, as well as 105 pairs of children's eyes (contact cases). Only seven cases were found which showed evidence of previous or present iritis; probably all these were not of tuberculous origin.

The diagnosis of tuberculous iritis is not simple, and the best one can do in most cases is to diagnose it tentatively. The so-called mutton-fat deposits on the posterior surface of the cornea are not pathognomonic; they are seen in too many other conditions to be considered seriously. The type of exudate and pigment deposit is dependent on the reaction of the iris to the irritant, the state of edema of the iris, and the duration of the edema. If the reaction is severe, the edema will be greater, and with it a release of exudate and washing-out of pigment granules. The focal-infection factor is still a matter of controversy. When foci are found and removed, some cases clear up rapidly, in others the condition is aggravated, and in many cases no foci of infection can be found that can be considered seriously as etiologic.

In 1908, the late Dr. Wilder had gone about as far as he cared to in the use of tuberculin in diagnosis and treatment of phlyctenulosis. In carrying on this work, Dr. Goldenburg had come to several definite conclusions: if he is reasonably sure of the diagnosis the case is treated as a tuberculous joint or lung would be treated. Physicians who specialize in tuberculosis do not use tuberculin after the fourth year.

Dr. William F. Moncreiff thought that one point brought out by Dr. Copps which is worthy of emphasis is the allergic nature of recurrent iritis. This is usually true regardless of the etiology. It would be interesting to know what Dr.

Copps's experience has been with the intravenous use of substances other than foreign protein, especially calcium gluconate and sodium thiosulphate.

Dr. Beulah Cushman referred to two cases of her own, which were treated for tuberculous iridocyclitis and kerato-iritis. The first was reported before the Colorado Congress of Ophthalmology in 1930: a 24-year-old colored girl, whose vision was O.D. 1.5, O.S. 0.2. There was a cyclitis in the left eye with intraocular tension of 60 mm. Hg. The Wassermann and Kahn reactions were four plus. One abscessed tooth was removed. Otherwise the general examination was negative. After intensive specific treatment and iridectomy the vision of the left eye improved to 1.0, then dropped again within four weeks to 0.2 and tension of 48 mm. Hg, with exudate and nodules in the iris. At this time the Mantoux test was definitely positive and with tuberculin desensitization the condition of the eyes improved rapidly. In eight weeks the vision of the left eye was 0.8+3, tension 20 mm. Hg; in three months 1.5 with normal tension. Desensitization was continued at intervals for two years and the general condition remained good with no recurrence of the iritis. In 1934 there was a recurrence; again the iritis responded promptly when tuberculin treatment was given.

During the past two years the patient had had frequent severe colds, and some loss of weight. No tuberculin treatment had been given since April, 1936. In January, 1937, she developed a severe acute cold, following which there was a productive cough, and in six weeks there was a severe pulmonary lesion. She is now in the County Hospital for tuberculosis.

The second case was in a man 30 years of age, who was seen in 1932 because of an acute keratitis in the left eye. Vision was O.D. 0.8, O.S. 0.4. The general examination was negative except that a roentgen film of the chest showed a small inactive lesion. Tuberculin treatment was instituted together with general hygienic care, and the kerato-iritis gradually regressed and the cloudiness disappeared, leaving empty corneal vessels. There was a mild recurrence one year later, after which the patient continued tuberculin treatment, feeling much better while under this care. The last treatment was given in June, 1936; in December the patient stated that he had no blurring of vision, but that general fatigue was so marked that he wished to start treatments again. He was advised to have a general examination with X-ray study of the chest, as he had had each time before the tuberculin therapy.

In January, 1937, an acute headache became so severe that he left work and was taken to the hospital after three days with symptoms of meningitis. A diagnosis of tuberculous meningitis was made and he died in 72 hours. At autopsy an old cold abscess was found in the frontal area; it had ruptured into the meninges.

These two case histories indicate that the eye lesions may be occasionally one of the early secondary foci, and that accounts for the rarity of the active pulmonary lesions. In an article by Meyers et al. in the January, 1937, Archives of Internal Medicine, the description of the early lesions seems to make this the most probable explanation, and if this be true no apology need be made for using tuberculin in treatment, to limit the lesions to millimeters of tissue involvement.

Dr. S. J. Meyer said that in the etiology of iritis one must take into consideration the class of patient and the location in which he lives; also the training of the ophthalmologist, with whom he has

worked, and where. Those who had training in Europe know that the old masters there have a great respect for the diagnosis of tuberculous iritis; probably it is not diagnosed here so often as it should be. He was glad that Dr. Copps had the courage to state that a certain number of his cases were supposedly of tuberculous etiology. Werdenberg of Switzerland does not believe that pulmonary tuberculosis is often found in cases of so-called tuberculous iritis. In treatment, although they stress hygienic treatment more than we do in this country, they hesitate to give tuberculin to any patients with pulmonary lesions. They also depend on X-ray studies of the chest first, to rule out any activity, because sometimes an active focus may be started if tuberculin is used. Personally, he thought tuberculin was useful.

Dr. Lyman Copps (closing) expressed his appreciation of the generous discussion. The conclusions were obtained by analysis of the tabulation of findings, which were recorded as accurately as possible. The cases were not selected, but were consecutive.

Dr. Brown asked about the length of time in which a cure was considered as having been effected. No new cases seen in the last year were included in the report, and those reported as cured have remained so for a period of from one to four years. Dr. Beard and Dr. Allen asked the basis for the diagnosis of tuberculosis. There may be objection to the diagnosis in some cases. It is impossible clinically to make a diagnosis with absolute certainty. The diagnosis of tuberculosis was made principally after observing the behavior of the eye in each case. Every case was put through a routine focal-infection study and in all tuberculous cases all foci that were found were removed. The patients were hospitalized and examined by an internist. In all cases in which there were positive tuberculin skin tests X-ray examinations of the chest were made.

Various types of tuberculin were used for diagnosis; at first old tuberculin was administered in gradually increasing doses, the patient was kept in bed, and temperature records were made. Purified Protein Derivative (P.P.D.). is relied upon, dilutions being made for each test. Positive tests are the exception rather than the rule. Contacts are much less numerous in Wisconsin than in the larger cities. For treatment freshly diluted bacillary emulsion was used. Final diagnosis was made after study and observation, and as to this, behavior under rest and tuberculin therapy was considered important. No cases had been seen similar to the ones which had been reported by Dr. Brown in which rest in bed alone produced beneficial or curative results. Tuberculin therapy did seem to produce definite improvement, and in some cases the problem of maintaining a permanent state of desensitization was great. One case, for example, had been under observation for about nine years, during which time the patient had had numerous courses of therapy and all sorts of supportive treatment. When tuberculin was stopped, the iritis recurred, and she is now getting injections weekly which, unless something better is found, she will probably have to continue for the remainder of her life.

Dr. Goldenburg mentioned the rareness of iritis in active cases of tuberculosis. One case reported showed that the iritis disappeared and the patient died. In a 60-bed tuberculosis sanitarium, eye cases had been seen for many years, and no active cases of iritis had been observed. Dr. Moncreiff asked about the use of calcium gluconate and sodium thiosulphate. These have been used, but little definite benefit had been noted. For for-

eign protein sterilized milk is relied upon principally, occasionally typhoid vaccine is used.

THE EFFECT OF OVARIAN FOLLICULAR HORMONE ON GALACTOSE CATARACT.

DR. JOHN C. BELLOWS and MR. LAWRENCE ROSNER M.S. read a paper on this subject which was published in this Journal (November, 1937).

HERPES ZOSTER OPHTHALMICUS WITH OPHTHALMOPLEGIA AND EXOPHTHALMOS

DR. RAYMOND CARMODY (Gary, Indiana), read a paper on this subject.

Discussion. Dr. William F. Moncreiff said that it has been known for many years that herpetic lesions occur with inflammation of the sensory nerves; it need not be surprising if motor nerves are similarly affected, even though histologic proof be lacking.

Dr. Leo Mayer mentioned a case in a man 66 years of age, who noted blurring of the eye while on a visit in Florida. An ophthalmologist there diagnosed a hemorrhage of the globe. When the patient returned to Chicago the globe was intact, the media were clear, and the fundus was clearly seen. There was a herpes involving the upper lid of the right eye, but no involvement of the cornea and no loss of sensation. When seen again three days later, a slight exophthalmos (2 mm.) was present, with complete paralysis of the external-rectus muscle and no paralysis of the pupil. The globe itself deep in the socket was very red, and it was difficult to account for this external redness. There was no injection of the conjunctiva, but the entire deep portion of the cul-de-sac was markedly inflamed without secretion or pain or signs of swelling. It is hard to say what the outcome will be in this case, as the patient has been under observation for only a few days. He has a negative Wassermann reaction and no history pointing to a syphilitic lesion. Thus it will be seen that there are cases in which herpes occurs with paralysis, without the presence of a positive Wassermann reaction.

Dr. J. E. Lebensohn said that idiopathic herpes zoster ophthalmicus is due to a virus akin to that causing chicken pox. In the family of a woman of 73 years, recently under observation for this condition, chicken-pox developed three weeks after the onset of her illness, affecting two mature adults and one child. If a similar condition is caused by syphilis, tumor, or hemorrhage affecting the Gasserian ganglion, it should be differentiated by the term symptomatic herpes zoster ophthalmicus. The cases associated with proptosis or ophthalmoplegia probably belong in this latter group. The vascular congestion of the anterior segment, mentioned by Dr. Mayer, is to be anticipated in all these conditions. Irritation of the fifth nerve, and especially of its ganglion, causes reflex stimulation of the antidromic fibers to the vessels. This is the cause of the well-known trigeminal pupillary reflex. A foreign body in the cornea causes a small pupil entirely because of the reflex vascular congestion of the iris. With greater irritation ciliary congestion results, which may be spread over into the conjunctival vessels.

Robert von der Heydt

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READING DIFFICULTIES

Ophthalmologists have taken a good deal of trouble to impress upon teachers and parents the fact that retardation in school work is often due to visual defects and refractive errors. The general truth of this statement cannot be questioned. But, after careful measurement and fitting of the proper glasses, ophthalmologists and parents alike are often gravely disappointed by lack of improvement in the little patient's school record.

There are cases in which the child's general intelligence seems excellent and yet his reading ability is atrociously poor. Such children are apt to be blamed for inattentiveness, restlessness, lack of desire to learn, when as a matter of fact they are afflicted with a natural difficulty in learning to read. The sufferer may substitute one word for another, may substitute one letter for another, may invert the order of letters, may omit letters or whole words.

The condition has been referred to as "word blindness." But this term suggests a confusion with the cerebral lesions of later life, due to intracranial pathology or traumatism. The affected children are not word-blind. They see the word on the printed page, but are unable to recall the mental picture of the word which they have just seen.

To this defect the psychiatrist Orton has applied the name "strephosymbolia," from Greek roots signifying "twisted symbols," because the afflicted person distorts or "twists" the arrangement of letters which form a word. (Samuel Torrey Orton, "Reading, writing, and speech problems in children.") Rönne uses the expression "dyslexia."

Reading disability may of course be merely a part of a general intellectual defect. But it must not be regarded as a special disability unless it is contrasted with normal or special ability in other fields of mental activity. As a striking example of such contrast, Orton mentions the case of a boy who, after three years in school, was reading almost nothing, and was spelling even less, but who had an intelligence quotient of 145, and in every other field except reading, spelling, and writing was ranked as a "near genius."

In the progress of civilization the art of reading was a relatively late addition to the faculty of speech. In the complete process of reading, a complex act of vision must at first be translated into an orderly group of sounds and then into a meaning or idea. At first slow and conscious, these steps later become automatic and extremely rapid, and recede into what we are pleased to call the subconscious.

Orton tells us that in the Iowa public schools investigation revealed that the "sight" or "flash-card" method of teaching to read resulted in three times as great a proportion of cases of reading difficulty as did the "sound" method of teaching.

For many years there has been an increasing emphasis on the advantages of silent reading, beginning approximately with the third grade. It is possible that, congenitally or by early environment, some school children are much less fitted than others for the silent method.

No entirely satisfactory explanation for the existence of strephosymbolia or dyslexia has been put forward. It has been variously blamed upon emotional disturbances, upon a general indifference toward all forms of school work, upon lack of harmony between teacher and pupil, and upon defective home training. It is probably aggravated in some degree by the sort of fear neurosis which may develop in a child who is anxious to succeed but lives in constant anticipation of failure. But in every large school there are many cases in which the existence of strephosymbolia cannot be blamed primarily upon any of the factors just mentioned.

Orton is satisfied that the great majority of these children see the letters well enough, but simply fail to remember vividly and collectively what they have momentarily seen. There may be no refractive error, and if one exists it may have no important bearing on the problem. The child is often attentive and eager when dealing with a subject in which he does not encounter special difficulty. He may be an eager listener to the printed page as read by others in the school or in the home. Conscious of his own reading difficulties and eager to overcome them, his restlessness may be the result of a sense of personal insufficiency and defeat.

Every step lost in school makes further progress more difficult. If the situation is only recognized after several years' delay, then, in spite of special efforts in the home or through individual tuition, the handicap is often little short of insuperable. The evil must be remedied early if the best possible results are to be hoped for.

"Obviously," says Orton," "the earlier special measures are adopted . . . the greater will be the chance of ultimate success, and we feel that no child with average intelligence or better should be allowed to continue into his second year of schooling, if there be tangible evidence of a reading difficulty, without an analysis to determine whether or not he be of the strephosymbolic group so that special measures may be instituted, when indicated, before he suffers the emotional disorders and language deficits which are usually cumulative from this time on."

In Orton's efforts at special training of such cases, the great majority had already been unsuccessfully exposed to the "sight" or "flash-card" method of teaching reading. He came therefore to feel not only that repeated "flash" exposure of the whole word was ineffective, but that in certain children it might even increase the tendency to confusion and failure of recognition. Rather he made use of their normal development in spoken language to teach them the phonetic values of the printed letters and the process of blending such letters in sequences.

Some of the children, seen in the first or second year of school, or even later, were made to trace the letters over patterns drawn by the teacher, at the same time giving the phonetic equivalents. The emotional reactions of the child were important for success. Simply teaching the child the sounds for the individual letters and their variations was entirely inadequate.

The habit shown by some children, of pointing to the words while reading, has been criticized as retarding the rate of reading. But Orton raises the very important questions whether this habit arises from the fact that the child is a slow reader and whether he is slow because of strephosymbolic confusions and uses the finger to overcome the difficulty. "Our choice," he says, "may not lie between rapid and slow reading but between slow reading or none at all." Orton has therefore actually resorted to use of this trick to encourage the habit of progression toward the right.

The possibility of cure will vary with individual cases. Sometimes the only hope will lie with patient, kindly, individual tuition, in some instances to be accomplished by the mother, in others by a hired tutor who grasps the psychologic realities of the case. The writer of the present comment has recently had personal contact with a case in which the first tutor employed was a complete failure because she persisted in use of the "flash-card" method of repeated attempts at identification of whole words; whereas a second tutor stimulated the pupil's advance by resorting to emphasis upon phonetic values.

Such a child cannot be expected at once to read passages normally pertaining to his age. Moreover, all sense of punishment for failure must be carefully avoided. It may frequently be necessary to ask the cordial coöperation of teachers in subjects to which reading is merely incidental. Thus, for example, a child may fail in arithmetic because he cannot read the problems.

Although recognizing that refractive errors may help to create reading difficulties, the thoughtful and sympathetic refractionist needs to remember that the history of the case, and the child's behavior in a reading test, may often suggest that a refractive error has little immediate importance. In such cases the ophthalmologist may prove more useful by offering suggestions as to home treatment and as to enlisting the broad understanding of the school teacher, or even by referring the patient for study by a psychiatrist. W. H. Crisp.

THE QUACK IN SPECTACLES

The quack is perfectly at home in spectacles. For hundreds of years the great uneducated mass of mankind has regarded spectacles as an evidence of wisdom, or at least of experience; and the predisposition has been to listen to the voice of him who assumes this mark of fitness to instruct. In the absence of statistics, we may assume that the quack in general understands this, and resorts to this mask as a first and most important mode of concealing his predatory purpose. It is not surprising that one of the most

general and aggressive groups of quacks in our time, should make spectacles, with spectacular false claims their chief field of activity and most important qualification for their trade.

The Lancet (1937, v. 2, p. 1157) calls attention to a libel suit against the publishers, for an article headed "Two quacks with degrees," published in "John Bull." One of them advertised himself as "the Eminent London Eyesight Specialist," the other calling himself "the Principal of the Northern Optical Service of Holloway Arcade, London." The two degrees were: F.I.B.O., "Fellow of the Institute of British Optometrists," and F.Q.O.P.A., "Fellow of the Qualified Optical Practitioners Association." These are almost as imposing as "Fellow of the American College of Surgeons," or "Member of the American Academy of Ophthalmology and Oto-Laryngology." They contrast strongly with the colloquial terms "Eye Doctor," or "Eye Physician."

In this trial the plaintiff, Mr. Buford, "claimed that the ordinary optician nowadays was a sight testing and not merely a mere routine dispensing optician. 'Testing eyes,' he said, 'was a mere routine operation; lads of 16 years could do it after three weeks' instruction. If he found any abnormality in a customer's eyes, he always referred the customer to an ophthalmic surgeon.' Such a surgeon "from Harley street," "was called and testified that Mr. Buford had sent him such patients, which he had already diagnosed." Asked about the examination for his degree, Mr. Buford said: "Examinations did not matter, the important thing was experience." "Have you ever asked yourself," inquired the Lord Chief Justice, "at whose expense you have learned?" The jury decided it should not be at the expense of the publishers of "John Bull."

The wizards and mountebanks of all ages have had certain words to carry the charm and work their miracles. In former ages "educated" men believed in magic; and some who consider themselves in the "upper classes" still do. The quack in spectacles today uses "Optometrist" and "Eye-Sight Specialist" to work his magic. It was also necessary to have some material object; as a special coin, or a rabbit's foot, on which the victim's attention could be fixed to keep up his faith in what was done for him. For the quack in spectacles, the particular brand of lenses he uses takes the place of the lucky penny, or rabbit's foot. He relies on high-power salesmanship to do the rest. "Experience" means a knowledge of human nature, an understanding of the supremacy of fashion, the efficacy of "the latest thing," the framing of a statement that implies satisfaction of all that the customer desires.

Between the spectacle salesman and the eye physician, there will always be a radical difference. The objective of the one is the sale of glasses; of the other the good of the patient. Expert salesmanship and scientific measurement cannot be carried on together. The one seeks to make the customer see the things as the salesman desires, the other to find out the exact truth of the patient's needs, and to get a true balance between all the conflicting evidence of different indications for or against the patient's relief by glasses. Even the salesman with an M.D. will still be a salesman. The physician with the greatest interest in optics must still recognize as the main objective, the patient's good.

Edward Jackson.

THE SURGERY OF TRACHOMA

Although, through the researches of Julianelle and Thygeson especially, in this country, and through those of Stewart,

MacCallan, Nicolle, and others in Europe, we seem to be nearing the goal in the etiological quest of trachoma, and from this may reasonably hope that in the not-too-distant future preventive measures may be found whereby the incidence of this scourge will be greatly reduced and finally wiped out, there are still millions of cases in the world, and great numbers of them will probably present themselves for many years to come.

Pathological changes that require surgery are liable to occurrence in severe, long-standing cases. Most important of these are contractions of the palpebral conjunctiva producing entropion and trichiasis, and second, roughness of the conjunctiva and underlying cartilage, causing a constant irritation of the cornea. Operations that have for their object the correction of these defects have been many in number; they have been described in the literature for more than 60 years. In 1882 Heisrath advised removal of the upper part of the tarsal plate and the excision of the retrotarsal fold. Claiborne in 1911 advocated total tarsectomy.

Ocular surgery is concerned with such minutiae of procedure that even important contributions may deal only with matters of details. Hence, innumerable operations, varying only in minor details, have been suggested for entropion, trichiasis, and pannus.

A disease that is as prevalent as trachoma offers ample surgical opportunties, hence it is advisable not to suggest a new operative procedure until its efficacy has been tried many times.

In this issue of the Journal are described three operations for complications of trachoma, all of which appear to have been thoroughly put to the test. One is proposed by a surgeon who had used the method in 155 cases when he made his preliminary report before the International Congress in Amsterdam. The operation was originally described in Duverger and Velter's "Ophthalmic surgery." The present author has used the operation in several hundred more cases since his first report. Amazing is the fact that he has never seen an infection in spite of pyorrhea of the gums adjacent to the areas from which mucous-membrane grafts were taken. He recommends this operation of tarsectomy and mucous-membrane grafting in only very serious cases that cannot be handled by simpler methods.

The other two operations described in this issue are for the cure of entropion and are applicable especially in old cases in which there are smoothly contracted conjunctivae. They are variations of similar procedures used for many years. Each seems to have some excellent features.

A considerable experience is required to evaluate any operation and especially plastic operations. There are so many unexpected happenings owing to differences in individual cases that many operations of each type must be performed before the surgeon will be satisfied that he has hit on the best method. The current practice at the trachoma hospital in Rolla, Missouri, where much surgery is done for this type of case, is the Ewing modification of the operation devised by John Green. It consists essentially in carrying a section entirely through conjunctiva and cartilage the whole length of the cartilage, about 2 mm. from the lid border. Double-armed black-silk sutures, usually about five in number, are introduced through the upper lips of the conjunctival incision, passed between the distal part of the divided cartilage and the skin, and brought out through the skin just proximal to the line of the lashes. These are then tied over a cord with enough tension to evert the lid slightly.

Methods such as the ones described

in the articles published in this issue may prove more effectual than this older one, although it has proved very satisfactory. These procedures might well be given a trial.

Lawrence T. Post.

BOOK NOTICES

BULLETIN OF THE OPHTHALMOLOGICAL SOCIETY OF EGYPT. 1936. 250 pp. Illustrated. Cairo, published by the Society.

Among society transactions, published in English, this ranks high in practical value. It is in English, all of it except one short paragraph of discussion and 13 pages reproducing a medieval account of the treatment of trachoma in Arabic. In Egypt they still think trachoma important. The first seven papers are devoted to it; including its pathology, its history and antiquity, trachoma of the lacrimal apparatus, its treatment in Egyptian Government ophthalmic hospitals and primary schools, and the constitutional side in the pathology and treatment of trachoma. Probably in the literature of a year there is less of interest and practical importance to be found elsewhere, than there is in these 130 pages devoted to the papers and discussions on trachoma.

After the trachoma symposium come three operative papers, dealing with iridectomy, intracapsular extraction, and the operative treatment of detached retina of the macular region, summarized in Arabic. There are eight other papers: on fatty degeneration in the cornea, polycoria, traumatic depigmentation of the iris, ectopia lentis, capsular glaucoma, sympathetic ophthalmia, contact glasses, and tuberculosis of the eye. The illustrations are chiefly photographic reproductions of microscopic slides, and two plates of ancient instruments used for the treatment of trachoma. Probably the holding of the 1937 Ophthalmological Congress in Cairo will interest a larger circle of ophthalmologists in Egypt and its Ophthalmological Society, which has now reached its thirty-fourth year.

Edward Jackson.

ANUARIO MEDICO-SOCIAL DE CUBA. Founded and directed by Dr. Tomas R. Yanes. 1937. Cloth cover, 683 pages. Published under the auspices of the Revista Cubana de Oto-Neuro-Oftalmiatria. Havana; Ucar, Garcia, y Cia. Price $5.00.

This is apparently the first directory of the medical profession of Cuba. Excellently printed and bound, it is a credit to Dr. Yanes the editor and founder, to the physicians of Cuba, and to the young Spanish-American republic with which we of the United States stand in so close a relationship.

In his foreword, Dr. Yanes points out that Cuban physicians, scattered throughout more than 200 localities, have hitherto lacked any guide as to the places of practice of their many colleagues.

The physician of the United States would find in this directory a number of novel features. Not only the full name of each Cuban physician is given, but the full name of his wife and of each of his sons and daughters, if any. Each physician's year of graduation is shown, but not his age.

Introductory chapters deal with prehistoric medicine in Cuba, the history of the University of Havana and its medical department, the history of medicine and surgery in Cuba, the history of the medical press in Cuba, Cuban medical associations and congresses, and the history of local hospitals and clinical institutions. After the "medico-social" lists for Havana and for the provinces and other cities, comes a list of graduates of the faculty of medicine of the University of

Havana from 1842 to date, then a list of the 143 graduates of the nineteenth century who still practice their profession, a surprisingly long list of army physicians, a list of graduate nurses (all male!), and a list of pharmacies.

A curious feature of the directory is a series of 22 clever full-page caricature-portraits in color of Cuban specialists, including the editor of the volume.

W. H. Crisp.

DEVELOPMENTAL ABNORMALITIES OF THE EYE. By Ida Mann. Clothbound, 444 pages, 283 figures. Cambridge: at The University Press; New York, The Macmillan Company, 1937. Price $15.00.

This outstanding work is a logical successor to "The development of the human eye," written some years ago by the same author. It is a beautiful book, well written, exquisitely illustrated. The many colored plates are second to none both for their natural beauty and for the adequate presentation of the subject in question.

The first chapter of 46 pages is appropriately devoted to general considerations of the mechanism of the production of developmental abnormalities. Abnormalities are classified as to which of three groups they belong to: (1) a simple arrest of development, (2) a pure aberration, or (3) an arrest with subsequent further but aberrant growth. These are analyzed and their relations to the periods of development are pointed out. These periods are the organogenetic, the neofetal, the fetal, the neonatal, and the postnatal. Etiology is considered; especially the transplacental passage of toxins, and pressure and trauma. Finally, in this excellent chapter, is given a clear concept of genetics as related to the eye.

Chapters 2 and 3 discuss deformities of the skull affecting the orbits and abnormalities affecting the eye as a whole.

It is not feasible to enumerate here the contents of the book, nor is it possible to select any chapters for special mention without doing an injustice to those that are overlooked. The longest and most beautifully illustrated is that on the iris.

Much normal embryology is of necessity included in order to explain the abnormal. Hence the study of the book revives the reader's interest in that subject and is of great value as a review.

This book is a classic. A copy should be owned by every ophthalmologist. Though primarily for a reference, it makes exceedingly interesting reading from cover to cover.

Lawrence T. Post.

OBITUARY

ALEXANDER HILL GRIFFITH

A. Hill Griffith, for many years a leading ophthalmologist of Manchester, England, died November 24, 1937, in the seventy-ninth year of his life. He took his medical degree at Aberdeen, and was an F.R.C.S. Edinburgh, and went to Manchester as house surgeon of the Royal Eye Hospital. After he was engaged in private practice, his hospital work at the Royal Infirmary and the Eye Hospital still came first. As a graduate teacher he was popular; but, believing in personal instruction, he restricted the number admitted to his classes.

In 1885 he became a member of the Ophthalmological Society of the United Kingdom, was for three years vice-president, and later became a life member. Each year he contributed something of importance to the proceedings of the Society, dealing with practical matters, rather than original observations and academic theories. To the Norris and Oliver "System of diseases of the eye," Griffith contributed a chapter on "The choroid and vitreous." In 1921, on account of

failing health, he withdrew from practice and removed from Manchester, to Woking, Surrey. But he continued to take part in discussions of the Ophthalmological Society. He was one of the writers who early recognized the importance of tuberculosis as a cause of ocular disease, and did some pioneer work on fields of vision.

Edward Jackson.

CORRESPONDENCE

THE XVTH INTERNATIONAL OPHTHALMOLOGICAL CONGRESS

January 26, 1936

The Golden Age of Ophthalmology, between the years of 1850 and 1870, was marked by a marvelous development in ophthalmic knowledge. A group of young men thoroughly trained in the fundamentals of medicine were given the ophthalmoscope by Helmholtz. This opened a whole realm, hitherto undiscovered, in the interior of the eye and marked the advent of a new era. It stimulated research in anatomy, physiology, and physics. New structures were discovered, and the whole intraocular area was disclosed. Refinements in microscopy developed histological structures not before recognized. Bowman had demonstrated an additional membrane in the cornea. Donders had placed refraction on a scientific basis, and von Graefe with his brilliancy and enthusiasm enlarged the then limited knowledge relating to every ophthalmological problem. These men with von Arlt, the Jaegers, von Stellweg, the young Landolt, Critchett, and others were alive to the new possible developments.

There had to be an organization through which they could discuss the new discoveries as well as an organ through which to publish them. Von Graefe established his "Archiv für Ophthalmologie," and the "Deutsche Ophthalmologische Gesellschaft" came into being. The broadening of research brought many able foreign workers into the field. From America came Williams of Cincinnati, Derby, and Agnew, and others. Knapp of New York, who had been Graefe's first assistant, coming from his professorship in Heidelberg, bringing his teachings to the new world, and adding to the new knowledge, founded the "Archives of Ophthalmology and Otology," for those specialities were then taken together. A more extensive medium had to be planned through which their observations could be correlated and opinions discussed and compared. So the First International Ophthalmological Congress was organized to meet at intervals of five years, in order that discoveries announced might have time to be verified before they were publicly proclaimed as authoritative. These gatherings held periodically proved to be immensely stimulating to those who took part in them. The recognition of the personalities of those who were writing, the personal friendships that were formed, the breaking down of nationalistic barriers, all served to aid in developing a solidarity and a mutual respect, each for the others, among the members of this branch of the medical profession.

The last of these international gatherings before the war was held in Naples, in 1914, under the presidency of the scholarly Italian, Professor Angelucci. Those who had the good fortune to attend it will never forget the ability and the courtesy of this splendid teacher. The next was to have been in Russia. The intervention of the World War not only made this impossible but it broke down established friendships and it made a gathering of the representatives of the nations impossible until 1922, when an English-speaking Congress was held in Washington, D.C. Still later a Congress in which the French and the Allied Na-

tions took part was held in London under the presidency of Treacher Collins, but it was not until the XIIIth Congress in 1929 was held in the neutral country of Holland at The Hague that representatives from throughout the world were again brought together. Here, under the wise and conciliatory guidance of van der Hoeve, who with his intimate knowledge of the important languages of Europe and his sympathetic understanding of those politically differing, carried an element of friendship wherever he went and made possible such an *entente cordiale* as had not existed in the previous two decades.

Again, in the neutral country of Spain, under the equally scientific and kindly direction of Marquez, the XIVth Congress was held, and now in the Near East, the XVth Congress has just been concluded at Cairo.

The great value of these international meetings is by no means in the facts that the members may carry away with them. The mediums of communication have been multiplied and there are few important discoveries, let them be made anywhere in the civilized world, that are not quickly brought to the attention of those who are interested in them. Abstracts and reviews as well as original articles in different tongues are now available everywhere. But the influence of a great man is not altogether in what he does or in what he says; it is more in what he is!

To hear the voices of the great teachers, to meet and converse with them, to renew old friendships between pupil and teacher is one of the great advantages of such international gatherings as that which has just been held in Egypt. To those who were sufficiently interested to become members of the Congress, abstracts of the various papers that were to be read were sent in advance. But the most valuable moments that one spends at such a time are not necessarily in the auditorium where papers are read but in the hotel lobbies and in the informal conferences where an intimate exchange of personal opinion gives a stimulus that can never come from the printed page.

So it may be said from this standpoint that the meeting in Cairo was a most successful one. Under the presidency of the erudite Nordenson who spoke not only in his own language but in German, French, and English with equal fluency, the sessions moved smoothly and efficiently. One cannot but be impressed by the superior linguistic accomplishments of our European colleagues. By many of them three languages are spoken with fluency and by some several more. The importance of a speaking acquaintance with French and German should be impressed upon our younger men, whose range of interest will be greatly broadened thereby.

It was Donders who once said to his class, "This university is open to all the world and if a German arrives I shall lecture in German; if an Englishman in English"—and then he added, "And every student of medicine should be able to understand these languages"; and he might have said, it would be increasingly to his advantage if he could know at least one more.

The opening session in the Egyptian University was marked with dignity and distinction. The Congress was opened by the young King, who with a group of princes and others constituting his suite appeared in the Royal box reserved for them promptly at the appointed hour and remained until the president's address, given in French, was completed. The Egyptian officials occupying the left side of the stage were picturesque in their red fezzes, which were worn indoors as well as out. The representatives of the leading nations occupied the front row of seats and after a gracious address from the

Minister of Health each responded for his country. Among these were Löhlein representing Germany; Marquez, Spain; Sinclair, Great Britain; Terrien, France; Bardelli, Italy; Koyanagi, Japan. Szymanski, former president of the Polish Senate, spoke for Poland, as well as for all the other nations.

Dr. Walter Parker of the Council, who was to have spoken for the United States, was unfortunately unable to be present, and Dr. Harry Gradle's boat being delayed, he also was unable to reach the session at its commencement.

The two subjects for discussion were "Hypertension of the retinal arteries" and "Endocrines in relation to the eyes." These received extensive consideration. The joint paper by Wagener and Keith was most comprehensive, and the others, which will be reviewed later, were equally valuable. Some of them had, indeed, been presented before other organizations previous to this conference and therefore did not comprise entirely new material. If any criticism were to be made on the program it would be toward simplification of the papers presented. It is hardly necessary to cover so exhaustively the subject matters under consideration. It is safe to assume that those attending a Congress of this character are fairly well informed in regard to the essential underlying principles of the topics presented for discussion. More careful research, more complete verifications by other observers, and a condensation of the subject matter, giving more essentially new matter, would shorten the papers and make them of greater interest.

With four years intervening between these Congresses it would seem that greater time should be given to the preparation of the papers and to their coördination; they should be sifted with greater care and they should be so presented that those on a single subject would form a symposium rather than a series of disconnected papers. The failure to do this made numerous repetitions inevitable. Many of the colored illustrations in the voluntary papers, while excellent and individually of value, were not sufficiently different from the others to justify the great cost which their publication will entail.

It would seem desirable in another Congress, too, that a more efficient method of interpreting the papers presented could be determined upon. For those who are not familiar with the Continental languages almost entire sessions were nullified. This made it necessary that the Italians should speak to the Italians, the Germans to the Germans, and the French to the French, rather than that all should be made familiar with the important matters which the papers contained. Had there been fewer papers and a summary of each made in each of the principal languages, all would have been able to follow, and the result would have been of greater value.

The Egyptian Government was lavish in its hospitalities. The reception by the King in Abdine Palace was an exceedingly brilliant affair. Soldiers in palace uniforms stood on each side of the long stairway and through the auditorium leading to the reception hall. The official groups representing the various countries were then presented to His Majesty King Farouk, who later with his suite occupied the Royal chairs in the Palace Theater at which was given an opera with noted singers, followed by a play in Arabic, the story of the play being given on the programs. At the conclusion of the entertainment the guests were entertained at supper, for which the King and his suite remained. Special reductions in railroad rates, on the Nile boats, and in airplanes were given to the members of the Congress. In commemoration of the Congress

a special series of stamps had been designed. A postoffice was established in the Semiramis Hotel, at which the Congress was held, and members of the Congress were given free postage for their letters and packages during the period of the sessions.

For the first time the United States was officially represented at an international congress of this kind, the following being appointed by the Secretary of State with the approval of the President.

Dr. Harry S. Gradle, director of the staff, Illinois Eye and Ear Infirmary, Chicago, Illinois, chairman of the delegation.

Dr. Frank E. Burch, professor of ophthalmology, University of Minnesota, Minneapolis, Minnesota.

Dr. E. V. L. Brown, professor of ophthalmology, University of Chicago, Chicago, Illinois.

Dr. F. Park Lewis, ophthalmologist, Buffalo, New York.

Dr. Henry P. Wagener, associate professor of ophthalmology, University of Minnesota, Minneapolis, Minnesota.

The next congress will be held in 1941 in Vienna. Owing to the disturbed political conditions in Europe and the apprehended dangers on the Mediterranean, many Americans who would otherwise have attended, failed to go. Had there been a larger delegation from the United States the next Congress would have come to America as the vote was almost large enough to bring it to America as it was.

Park Lewis.

January 24, 1938

I

Only those who make a habit of going to international congresses realize how inadequate a substitute for personal attendance is the cold printed page of proceedings. The zestful local color, the international friendships that may be made and cemented, the stimulating contacts with creative and enthusiastic workers in science, and the acquisition of first-hand knowledge are only for the one who attends. True, it takes time and money. But it must be realized that the hosts also spend an enormous amount of labor and great sums of money to make a Congress

العين السليمة

L'ŒIL OUDJAT

The "Oudjat," an amulet 4,000 years old which the Congress adopted for its emblem. It represents the legend of Horus, the son of Osiris, slain by Seth, and losing an eye in the fray with Seth to avenge his father. Complete restoration of the eye was made possible by the magic intervention of Thoth who supplied the missing one-sixty-fourth part of it, the sum of the fractions on the figure below totaling only sixty-three sixty-fourths.

a success; so that the returns are decidedly worth the effort it costs a member to be present.

One who has attended all of the postwar Congresses can hardly help indulging in some noninvidious reminiscing. At Amsterdam in 1929 there was a Congress *suigeneris*—a postwar reunion of some 1,000 members from all parts of the world in an atmosphere of international good will and optimism. Spain in 1933 was a

young democratic republic, lustful, hopeful, and informal, West European in culture, and not a tourist's highway. It gave us a warm welcome, spent some $10,000 on entertaining about 700 members. There were no Russians and few Germans. Egypt, one of the world's most ancient countries, a mecca for tourists, is a formal feudal monarchy with an African-Arabic culture. The time was one of critical tension in international relations. It is estimated that only about 400 members came from abroad, yet $70,000 had been appropriated to entertain us. Tenue de soirée, habit de rigueur, and the requirement to wear decorations embarrassed many Americans as well as others. Lavish parties were given for us. King Farouk entertained the members at Abdine Palace with a play in Arabic, in which the sight of "Azza, the Khalif's daughter" is restored by love's magic, and a ballet. There were an opening soirée de gala, an official banquet, parties by the now fallen premier, by the president of the local committee, by the Egyptian Ophthalmological Society; excursions to pyramids, museums, mosques, to the irrigation plant of the Nile, to bazaars and university to keep us breathlessly busy during our entire stay of one week. The scientific sessions had to contend with all these distractions and with the beckoning cloudless Egyptian sky and did not fare so well in attendance.

The excursions that were not a distraction were those to the ophthalmic hospitals. Because of trachoma, or Egyptian ophthalmia, which has probably prevailed in Egypt since time immemorial, ophthalmology has always flourished there. References to the "Court Eye Physician Iri" are found on inscriptions 5,000 years old. Cyrus and Darius both sent to Egypt for their private eye physicians. Ophthalmology continued to flourish during the Alexandrian and Arabic periods, according to Professor Bardelli. There was an eye journal in Egypt as early as 1851. The modern antitrachoma campaign was started in 1903 through the philanthropy of Ernest Cassel, a London banker, and under the guidance of MacCallan. Later, the Ophthalmic Hospital Section of the Ministry of Public Health, with an appropriation of half a million dollars a year, and an enthusiastic staff of some 500 ophthalmologists, continued the work. It has achieved an inspiring example of well-organized public medicine. To give a faint idea of the magnitude of the work, there are over a million new ocular examinations made and some seven million old trachoma cases treated yearly in 59 permanent and in 14 traveling eye hospitals, all with ultramodern equipment. Even the tents which house the traveling eye hospitals are all provided with Gullstrands and slitlamps.

There were no daily bulletins for the Congress, nor did the abstract volume contain translations into other languages, as has been the practice at the previous Congresses. The latter circumstance handicapped discussion. As a reminder of the Madrid Congress, Marquez represented Spain. He and his wife, with their private hospital and home in Madrid destroyed, have been serving the cause of the republic, first in Valencia and now in Barcelona, and bore evidence of the physical strain of the civil war. Marquez spoke with emotion, but with restraint, of the tragedy of Spain at the official banquet. Nordenson also referred to it. The international situation was further reflected in the presence of refugee ophthalmologists from Germany and Spain (Arruga), who had found shelter in other lands, and of some German-Jewish ophthalmologists who, it was said, are to be saved from the fate accorded to others by the intervention of the International Council and by being declared "honorary Aryans."

Of all the national groups, aside from the Egyptians, who probably made up about a third of the Congress' attendance, the Italians, the nearest neighbors of Egypt, stood out both numerically and as to contributions. The Germans came in substantial numbers. There were no Russians. A considerable representation came from Palestine, the Near East, and the Far East. There was a sprinkling from almost every country of Europe. The American group was about 30 strong.

II

The preceding two international Congresses have dealt with special problems in ophthalmology: glaucoma, trachoma, retinal detachment, suprasellar tumors, and tuberculosis of the iris and ciliary body. For the XVth Congress at Cairo, the International Council, with the idea, as President Nordenson put it in his official themes: retinal arterial hypertension, sential unity of medicine, chose two official themes: retinal arterial hypertension, and endocrinology and the eye. The selection for one Congress of two such wide fields, wide as medicine itself, made of necessity for sketchiness and fragmentariness in the treatment of the program. The role of the ophthalmologist in these fields is only secondary, after all, to that of the internist and neurologist, who did not participate in the program. Furthermore, the discouragement of free or independent contributions by ophthalmologists, implied in the Council's announcements, probably deterred members from reporting on important work going on. One missed, for instance, discussion of such an active subject as corneal transplantation. Moreover, the superabundance of previously published material was freely commented upon. In the absence of a volume of abstracts, except in the original languages of the contributors, and pending their appearance in due course of time in the American Journal of Ophthalmology, the following brief summary of the proceedings, as they struck the writer, may be of interest.

Wagener, Thiel, Mylius, and Sallmann all dwelt on the possibility of diagnosis and prognosis in hypertension from the fundus picture alone, and differed in important respects. Bailliart, however, pointed out that one has no right to speak of retinal arterial hypertension without attempting to measure it by ophthalmodynamometry. Espildora Luque, Lauber, Sabbadini, DeSanctis, Horniker, Fritz, Pletneva, Barrada, Busacca, Klar, Cattaneo, and Cattaneo and Lasagna all reported on its value in various connections. Espildora Luque pointed out that retinal arterial hypertension may be a solitary ocular manifestation. Lauber called attention to the importance of retinal arterial *hypotension* in many optic atrophies, particularly tabetic, and to its being an indication for miotic and vigorous antiluetic treatment. Sabbadini stressed the importance of the diastolic pressure. DeSanctis found not only in the neighborhood crease with the lowering of the head, and suggested its determination as an index of cerebral vasomotor control in the examination of candidates for acrobatic flying. Fritz argued that it is the noncompensable anisospasticity, leading to atrophy at points of hypertension and to hemorrhages and exudates at points of hypotension, which is destructive. Cattaneo found retinal arterial hypertension greater on the side of lesion in 30 focal vascular cerebral lesions with hemiplegias. Cattaneo and Lasagna found retinal arterial hypertension to be influenced by rhinopathies and sinus surgery. Klar declared that a more precise diagnosis of a postconcussion syndrome is possible in the presence of retinal arterial hypertension. Horniker also found retinal

arterial hypotension in cases of head injuries, as late as two years afterwards. He further suggested that the ideal ophthalmodynamometer is one which permits the same person to examine the fundus and watch the pressure readings.

The pathologic changes studied and reported by Koyanagi in nephritic, eclamptic, hypertonic and diabetic retinitis led him to the conclusion that the fundamental lesion in the first two is an active pigment epithelium secretion and destruction consequent upon widespread hyaline and fatty intima changes in the choroid, and that the milder retinal vascular lesions are of the same nature and are found not only in the neighborhood of the papilla but are also retrobulbar. In hypertonic retinitis Koyanagi sees only a special form of retinal arteriosclerosis. Keyes and Goldblatt in their report on experimental hypertension described similar pathologic changes, but more marked in the retinal arteries than in the choroidal vessels. Igersheimer in his pathological material found retinal-ganglion-cell destruction and atrophic optic-nerve processes accompanying vascular lesions that were of a slight nature ophthalmoscopically. Serr, with the aid of moving pictures of the fundus in a case of glaucomatous arterial and venous pulse, demonstrated that the collapse of the veins was synchronous with systole and their filling up with diastole, and that the venous pulse is dependent on the pulsatory increase in the intraocular tension accompanying each cardiac systole.

Of the five official reports on "Endocrinology and the eye," four may be described as up-to-date reviews of various aspects of the subject. In their more stimulating and interpretative treatment of the relations between the eye and hypophysis, Jeandelize and Drouet drew attention to the direct and intricate relation between the master-gland's "intermedine," the autonomic centers in the hypothalamus, and the processes going on at the neuroepithelial level of the retina, and credited an American, P. Fridenberg, with pioneering in the field.

Of interest to the writer among the free communications were Lindner's paper dealing with the vitreous framework of the role of vitreous shrinking in ocular pathology, and Klar's paper casting doubt on the theory of insufficient lighting as the cause of miners' nystagmus by finding toxic gases as a factor.

Discussion, for reasons already mentioned, was meager. The scientific exhibit was unpretentious, and the commercial exhibit the usual one.

The writer did not attend the other two Congresses, held simultaneously; namely, that of the International Organization against Trachoma, and that of the International Society for the Prevention of Blindness; not because of lack of interest, but because of lack of resistance to the appeal of Egyptian sunshine and air. He confesses to having sinned against the Congress as much as the others.

The next Congress is to be held in Vienna. The Poles wanted it. So did the Americans. Gradle, however, came unsupported by a United States Government offer and made no headway. The United States may get it after this.

There were voices heard about the need of some censorship by National Societies of contributions to international congresses, and the voices were curiously American, unless "the voice is the voice of Jacob, but the hands are the hands of Esau."

Suggestions for themes for the next Congress are, I was told, in order. My own would be: "Industrial ophthalmology," to include "Industrial eye hygiene"; "Industrial occupational diseases"; and "Standardization of occupational visual requirements, of exami-

nation of the eyes for compensation purposes and of compensation for industrial eye injuries."

M. Davidson.

December 24, 1937

There were a little over 200 attendants at the Congress, divided roughly as follows: 35 to 40 Americans, 1 Canadian, 6 South Americans, 3 Japanese, 3 from Turkey, 4 Scandinavians, 25 Germans, 6 Hollanders, 20 French, 40 Italians, 2 Spaniards, 6 Englishmen, 4 Hungarians, 4 Austrians, 2 Czechoslovakians. The majority of the rest were Egyptians. (These figures are not absolutely accurate.)

From the social standpoint this was the most elaborate Congress that has ever been held. Lavish entertainments were the rule of the day, or rather, the night; for part of each day was given to excursions. On them particular attention was paid to the various ophthalmic hospitals where the daily routine was carried on. It was very noteworthy that MacCallan's original intention of manning the hospitals with Egyptian physicians has been carried out.

The hospitals are excellently equipped and handle enormous numbers of patients, both in and out; but scarcely a dent has been made in the surface. We of the United States have no concept of the ophthalmic problem of Egypt.

The Giza Laboratory was intensely interesting, for here, under the direction of Dr. Wilson, there is much work being done in investigating the cause of trachoma.

Many of the scientific sessions were interesting while others failed to hold the attention. Attendance at the meetings was not uniform, as many of the members seemed to come only according to the topic or according to the language used. Peculiarly enough, the demonstration session was entirely German, except for Dr. Hughes of New York, whose moving pictures of lower-lid repair met with great favor.

A very amusing method of balloting arose in connection with the choice of site for the next Congress. Invitations had been extended by Warsaw, Vienna, and the United States. So President Nordenson first announced that all in favor of America should move to the left side of the room and those in favor of Europe to the right side. Each side then filed past him for the counting, and Europe won, 72 to 54. Then the decision lay between Warsaw and Vienna, which the latter won by acclaim. So the next International Congress is to be held in Vienna in 1941, either in July or late August, according to Lindner.

Of course there were innumerable incidents concerning which reams could be written. But by and large it was a good show and well worth while. Old friendships were renewed and new acquaintances made. The Americans who attended made a good impression, both in numbers and in character of work presented.

Harry S. Gradle.

NOTE

A footnote should have been appended to the article by Dr. S. Judd Beach on "Benzedrine in cycloplegia," published in the foregoing issue, stating that this contribution was presented before the Academy of Ophthalmology and Otolaryngology at Chicago, in October, 1937.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is only mentioned in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Dressler, M. **Familial occurrence of Adie's syndrome and hippus.** Klin. Woch., 1937, v. 16, July 17, pp. 1013-1017.

Adie's syndrome or pupillotonia was found by the author in three sisters. This is the first observation of a familial occurrence of this syndrome, the nature of which seems now to appear in a different light. Infections or toxemias have usually been held responsible for the phenomenon, but they could be ruled out in the three sisters. It is doubtless a disturbance of the vegetative nervous system, so far of unknown nature, which may have a familial character, and may even rest on a hereditary basis. The author encourages careful examination of all members of a family in which this syndrome has been once found. All three of his patients showed marked hippus in the other eye. Bertha A. Klien.

Franta, Jiři. **Ascorbic acid (vitamin C) in aqueous metabolism.** Arch. f. Augenh., 1937, v. 110, Nov., p. 574.

The amount of ascorbic acid in the aqueous of rabbits, about 22 mg. per hundred c.c., depends largely upon the vitamin-C content of the intaken food. Thus in autumn the values were much lower than in summer. The amount of ascorbic acid in the aqueous rises sharply after taking glucose by mouth, or after intravenous injection of 30-percent glucose. After paracentesis the second aqueous contains less, but the third and fourth aqueous contain more, ascorbic acid. Radiation of the aqueous, in vivo or in vitro, brings about a rapid decrease of the ascorbic-acid content. The long-waved rays are more effective than the short-waved. The ascorbic-acid content of the human aqueous is 14 to 16 mg. per hundred c.c. In uveitis it is 3 mg., and in mature or immature cataract it is 2.3 mg. per hundred c.c. Normal ascorbic-acid contents were found, however, in adolescent persons who had been aphakic for several years.

R. Grunfeld.

Meyer, H. E. **Apparent reflex paralysis of the pupil and absent tendon reflexes.** Münch. med. Woch., 1937, v. 84, Nov. 12, pp. 1809-1811.

Five observations of pupillotonia (Adie's syndrome) with absent tendon

reflexes, and the differential diagnosis from Argyll Robertson pupil, are discussed. Acquaintance with this syndrome has great practical value, as cases diagnosed as healed tabes, or rudimentary or familial tabes, may have only disturbances of the vegetative nervous system in the sense of Adie's syndrome. Bertha A. Klien.

Nastri, F. **Research as to electric conduction in the aqueous humor as related to parathyroid deficiency.** Ann. di Ottal., 1937, v. 65, April, p. 291.

The author conducted his experiments on parathyroidectomized rabbits in which the characteristic lenticular changes developed. In every instance the values were within normal limits. (Bibliography.) Park Lewis.

Pesce, Girolamo. **Bilobate cyst of iris of traumatic origin.** Boll. d'Ocul., 1937, v. 16, Aug., pp. 861-879.

A youth of sixteen years had complained of photophobia and lacrimation since an injury to the right eye a year before. Examination showed an adherent leucoma at the 5-o'clock meridian of the injured eye, and two rounded masses filling up the lower segment of the anterior chamber and connected posteriorly with the iris. These had the same color as the iris, were semitransparent, communicated with each other, and their free upper margins formed a double dome occupying the lower half of the pupillary area. The tension was normal, and vision was 5/10. The operation consisted in a large keratotomy at the base of the cyst, which soon collapsed. The remaining walls were brought out with a forceps and excised. The irritative symptoms disappeared soon after. (Bibliography, 4 figures.)

M. Lombardo.

Strieff, J. **May Fuchs's heterochromia still be considered as a morbid entity having a special pathogenesis?** Ann. di Ottal., 1937, v. 65, April, p. 298.

In a critical review of Fuchs's heterochromia the author insists on the necessity of definitely distinguishing this form of disease and not including under the same classification the common iridocyclitis which Fuchs had himself considered as heterochromia complicata. The author develops the problem from the conception of Scalinci to the demonstration by Passow of a correlation between heterochromia and the "status dysraphicus." Park Lewis.

8

GLAUCOMA AND OCULAR TENSION

Ershkovich, I. G., and Shevalev, V. E. **Changes in intraocular tension caused by measured muscular activity in dogs.** Viestnik Opht., 1937, v. 11, pt. 2, p. 168.

The authors investigated the effect of 45 minutes of running on the intraocular tension of dogs. The data show a consistent drop in intraocular tension, which holds for several days. The blood serum of these dogs injected intravenously into other dogs produced a fall in the intraocular tension, demonstrating the presence of a tension-reducing substance in the blood of the fatigued animal. Ray K. Daily.

Favaloro, G. **Hemorrhagic glaucoma, its pathogenesis and therapy with special reference to the anterior form of Contino.** Ann. di Ottal., 1937, v. 65, April, p. 241.

In 1936 Contino described (see Amer. Jour. Ophth., 1937, v. 20, p. 443) an irritative form which he termed anterior hemorrhagic glaucoma, characterized by a deep anterior chamber, moderately dilated pupils, congestion of the iris vessels, and hypertension, in which

mydriatics have been beneficial, and miotics harmful. Favaloro believes anterior and posterior irritative glaucoma are dependent upon different conditions and demand different methods of treatment. He regards them respectively as a true primary glaucoma dependent on swelling of the vitreous which pushes the root of the iris forward and obstructs Schlemm's canal, and a secondary form with deep anterior chamber and in which by use of mydriatic the congestion of the iris may be relieved without occluding the exit. These views may apply to those cases of hemorrhagic glaucoma in which miotics have increased the pain and congestion.

Park Lewis.

Filatov, V. P. **The significance of muscular activity for the regulation of intraocular tension.** Viestnik Opht., 1937, v. 11, pt. 2, p. 151.

In clinical cases of glaucoma the addition of muscular exercise to the usual treatment had a beneficial effect on the course of the disease. This observation led the author to encourage a series of laboratory investigations on the subject. The investigations demonstrated that muscular activity in men raises the general blood pressure and lowers intraocular tension; that experimental fatigue in rabbits lowers intraocular tension; and that the serum of these animals, injected intravenously into control animals, lowers their intraocular tension. These facts lead the author to conjecture that lack of muscular activity may account for the nocturnal rise in intraocular tension.

Ray K. Daily.

Filatov, V. P., Ershkovich, I. G., and Fisher, A. G. **The effect of physical exercise on intraocular tension.** Viestnik Opht., 1937, v. 11, pt. 2, p. 154.

The effect of running was tested on eleven persons. The charted data show that in the majority of cases there is a rise in systolic blood presure and a fall in intraocular tension. The blood pressure returns to normal within a few minutes, but the intraocular tension remains lowered for one-half hour. The findings are similar after ball playing; but less pronounced after exercises with dumb bells and Martin's and Arnold's tests.

Ray K. Daily.

Filatov, V. P., Ershkovich, I. G., and Shevalev, V. E. **Experimental investigations on the effect of muscular activity on intraocular tension.** Viestnik Opht., 1937, v. 11, pt. 2, p. 161.

This is a report of a laboratory study on the effect of intravenous injections of muscle extract and blood serum of fatigued animals on the intraocular tension of normal animals. The objective was to find the source and character of the substance which affects the reflex mechanism to which Kalfa attributed the rise in intraocular tension in glaucoma. Heine and Krause found that in diabetic coma with convulsions the intraocular tension fell. Jongh and Wolff demonstrated experimentally the dependence of this fall in intraocular pressure on convulsions. Filatov has conceived the hypothesis that the lowered intraocular tension is caused by some product of muscular activity, which acts on a reflex apparatus regulating intraocular tension. He believes that the substance forms in the muscles, passes into the blood, and is carried to the eye. The data of the present investigation show effect of muscle extract to be negative. Injections of blood serum produce a definite fall in intraocular tension.

Ray K. Daily.

Kadlicky, Roman. **Iridencleisis of Del Bario.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 81-85.

Del Bario's "sclerociliary iridencleisis" is characterized by the construction of an internal fistula. After cyclodialysis, the iris is inserted between the sclera and the ciliary body so that the anterior chamber and the suprachoroidal space will not grow together, and a permanent fistula is formed. Mauksch had the same idea. Del Bario did not use forceps in entering the eye but a blunt crochet needle, finding this form of intervention much easier and less dangerous to the eye. The scleral incision must not be larger than in simple cyclodialysis. In this manner, the author has operated on 25 cases of glaucoma; 13 chronic simple, 10 chronic inflammatory, and 2 acute inflammatory. Considering the short time since these operations, he does not speak of permanent results. In 92 percent temporary results have been satisfactory. No better results have been demonstrated by other methods; iridectomy showing only 80 percent, trephining 87 percent, and cyclodialysis 84 percent as positive temporary results. The author observes that positive results depend not only on the kind of operation, but also in great measure upon the rate of improvement the patient shows. Georgiana D. Theobald.

Lindner, K. **The technique of producing a vitreous fistula.** Zeit. f. Augenh., 1937, v. 93, Oct., p. 117.

For three years the author has been using this as a preliminary operation for eyes with unusually high tension and all but absent anterior chamber, and after glaucoma operations and intracapsular cataract operations in which the anterior chamber has not reformed. His hope that it might now and again cure glaucoma with high tension by reëstablishing a deep anterior chamber (not by producing permanent fistulization) has not been realized. The operation is painful unless preceded by a subconjunctival injection of novocaine around the entire cornea over the region of the ciliary body. A conjunctival flap is then prepared in the lower outer quadrant and a suture inserted in the sclera for fixation of the eyeball. With a 2-mm. trephine the superficial half of the sclera is cut through at 10-mm. from the limbus and this entire depression electro-coagulated with a Larson electrode. The remainder of the sclera is then trephined with a 1.5-mm. trephine and the choroid pierced with a needle knife. The bead of normal vitreous that presents is abscinded with scissors and this process is repeated until fluid vitreous appears. The conjunctival flap may then be sutured.

The operation fails unless vitreous is removed, and in those cases of primary glaucoma in which fluid vitreous presents primarily, the author has noted no success. The operation is not a fistulizing operation. F. Herbert Haessler.

Makarov, N. N. **A peculiar hereditary form of glaucoma in the Transbaikal.** Viestnik Opht., 1937, v. 10, pt. 6, p. 850.

The author reports a hereditary, recessive, sex-linked form of glaucoma in this region. It occurs only in men, begins in the late thirties, and is simple chronic in type. Ray K. Daily.

Poos, F. **The behavior of ocular tension in acute intraocular vascular reactions.** Arch. f. Augenh., 1937, v. 110, Nov., p. 499.

Following subconjunctival injections of various substances, such as sympathetic and parasympathetic stimuli, dionin, histamin, and saline, the tension does not vary according to the pharmacologic properties of the drugs, but identical rises and falls alternate before

the tension returns to normal. An exception is the initial rise after sympathetic, and the initial fall after parasympathetic stimuli. The drugs or saline in higher concentrations exert only a pharmacotoxic effect upon the terminal, uveal, vascular system. The capillaries become paralyzed, the arterioles atonic. The atonic arterioles allow the blood to rush into the distended capillaries, causing a rise in tension. The greatly increased permeability of the capillaries permits dialyzation of an increased amount of fluid rich in albumen which again raises the tension. The venous outflow becomes impeded, and stasis is produced. Thus the blood will be richer in carbon dioxide and other metabolites which act as powerful stimuli to contract the arterioles even more than normally. The contracted arterioles empty the capillaries, the hydrostatic pressure falls, and with it the eye tension in spite of the presence of an aqueous rich in albumen. The venous outflow now becomes free, reabsorption of the fluid and albumen is resumed, and thus the abnormal stimuli which kept the arterioles in a contracted state are eliminated. The arterioles become atonic again, and the tension rises. The rise and fall of tension will continue until the damaged arterioles regain their normal state.

R. Grunfeld.

Tron, E., and Odnasheva, A. **The potassium calcium index and the adrenalin content of the blood in glaucoma.** Viestnik Opht., 1937, v. 11, pt. 1, p. 3.

The data on the potassium calcium ratio in the blood of 25 patients with primary glaucoma and in twenty control patients show no significant difference. These data give no indication as to the presence of sympathicotony or vagotony in glaucoma. Determination of vasoconstricting substances in the serum of fourteen glaucoma patients showed a definite increase in eleven cases.

Ray K. Daily.

9

CRYSTALLINE LENS

Argañaraz, Raul. **Senile cataract extraction by manual vacuum-cup. Vacuum avulsion or phacoërisis.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Oct., p. 609.

The author has further improved his previously described extractor by diminishing the length of the rubber tube to 18 or 20 cm. and its caliber to between 2 and 3 mm,. in order to obtain the minimum of 50 mm. of vacuum necessary for successful extraction.

M. Davidson.

Bietti, Giambattista. **Bullous keratitis as a postoperative complication after cataract extraction.** Boll. d'Ocul., 1937, v. 16, Aug. pp. 793-807.

A couple of years after successful operation for cataract on both eyes, a woman of 65 years became affected by edema of the cornea with recurrent formation of bullae, and accompanied by intense pain. A man of 71 years had cataract extraction on the left eye. A few weeks later, following a discission for secondary cataract, the cornea became infiltrated, with formation of epithelial bullae. A man of 69 years, affected by high blood pressure, diabetes, and nephritis, and a few days after cataract operation on the left eye showed edema of corneal stroma and epithelium, with small bullae. As treatment the author advises abrasion of all the corneal epithelium, associated with roentgen therapy. (Bibliography.)

M. Lombardo.

Borsotti, I. **Further experimental research on antigen therapy of the crystalline lens. An attempt at passive immunization.** Ann. di Ottal., 1937, v. 65, March, p. 230.

Supplementing various researches on presumed antigen therapy of the crystalline lens the author undertook to influence the rapidity of resorption of lenticular substance, introduced in definite amounts into the anterior chamber of rabbits, by injection of the serum of a rabbit or of a dog which had been treated for three weeks previously by injection of large quantities of lens emulsion. The experiments proved fruitless, as had others designed to give increased immunity. (Bibliography.)

Park Lewis.

Klauber, E. **Filamentous keratitis after cataract operation.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 690.

Klauber reports briefly three such observations. He believes they show that this disorder should be classed with herpetic rather than dehydration affections. F. Herbert Haessler.

Mattos, B. W. **My technique in the Barraquer operation.** Rev. Oto-Neuro-Oft., 1937, v. 12, Sept., p. 244.

The Barraquer operation is considered the most advantageous method of intracapsular extraction if proper attention is paid to all the details, namely: securing of maximal mydriasis, akinesia, and hypotony, a conjunctival suture, a scleral incision, and a peripheral iridectomy. M. Davidson.

Trovati, Emma. **Lenticular opacity in those having psoriasis.** Ann. di Ottal., 1937, v. 65, April, p. 256.

Dermatogenous cataract was first studied in 1868 by Rothmund, who observed in the same family several cases in which cataract was associated with a peculiar skin disease of a degenerative type with diffuse cutaneous atrophy and induration of the stratum of Malpighi. Both eyes were involved. The opacity had begun four to six weeks previously, and had developed so rapidly as to render the lenses opaque within a week.

The author reviews and discusses the cases that have since been recorded. With aid of the slitlamp she studied the eyes of a large number of people suffering from various forms of chronic dermatitis such as eczema, telangiectasis, scleroderma, and psoriasis. She found the dermatogenous type of opacity of the lens only in cases of generalized psoriasis. The opacities were punctate and progressive. (4 figures, bibliography.) Park Lewis.

Villani, Giuseppe. **Uricemia and cataract.** Ann. di Ottal., 1937, v. 65, April, p. 306.

This investigation calls attention to the importance of uric acid in the blood in the development of cataract. In 44 out of 60 persons affected by partial cortical cataract in both eyes, the uric acid was above normal. Uricemia is regarded by the author as one of the factors capable of producing senile cortical cataract or Scalinci's dyscrasia. (Bibliography.) Park Lewis.

Vogt, Alfred. **Dinitrophenol cataract.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 669.

Vogt discusses briefly the history of the nitrophenols and their pharmacology and gives an account of his experience with two patients who had cataract after taking dinitrophenol to reduce weight. In one of these acute stormy glaucoma occurred with rapid intumescence of the lens.

The earliest lenticular opacities are subcapsular and more dense posteriorly, followed by rapid intumescence. How very dependent the lens is on perfect nutrition is shown by the development of cataract in eclampsia, rickets, retinal detachment, retinitis pigmentosa and glaucoma, as well as with neurodermatitis, myotonia, and therapeutic radiation.

Legal restrictions in the use of dinitrophenol are recommended.

F. Herbert Haessler.

10

RETINA AND VITREOUS

Adrogué, E., and Reca, A. **Embolism of the superior macular artery.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Sept., p. 592.

A case of obstruction of the superior macular artery accompanied by flame-like hemorrhages and localized edema of the retina. Embolus rather than thrombosis is considered the basis, because of sudden onset, absence of cardiovascular pathology, and the male sex of the patient. An inferior paramacular scotoma resulted with vision of 9/10 six weeks later. (Illustrated.)

M. Davidson.

Alvis, B. Y. **Leukemic infiltration of the retina and choroid in an infant treated by X ray.** Amer. Jour. Ophth., 1938, v. 21, Jan., pp. 31-33.

Badke, G. **Measurements of the caliber of retinal vessels in hypertension and nephropathy.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 655.

Measurements taken with the Lobeck ocular show that normally the caliber of the retinal artery is less than that of the vein. In red hypertension, the arterial caliber is greater than normal and may be greater than of the vein. In pure red hypertension no decrease was ever observed. In transition from red to pale hypertension, decrease of arterial caliber is characteristic and begins in the peripheral vessels. The greatest decrease of arterial caliber is seen in fully developed pale hypertension. In chronic nephritis with normal systolic and diastolic blood pressure, the retinal arteries have normal caliber.

F. Herbert Haessler.

Braun, Reinhard. **A pathologic-anatomic contribution to disciform degeneration of the center of the fundus.** Arch. f. Augenh., 1937, v. 110, Nov., p. 535.

Histologic examination of an eye which came to enucleation because of suspicion of melanosarcoma revealed a large retroretinal hemorrhage and extensive connective tissue formation at the posterior pole of the eyeball lying on either side of the pigment epithelium of the retina. A circumscribed area of the lamina vitrea of the choroid was penetrated by connective tissue which took its origin in the choriocapillaris. In many cases, however, the lamina vitrea was entirely intact. In these the connective tissue might have taken its origin from preformed tissues in Bruch's membrane, as suggested by Rechling, who found a delicate layer of connective tissue on Bruch's membrane in senile but otherwise normal eyes.

R. Grunfeld.

Bulson, E. L. **Experimental studies of the effect on retinal blood pressure and intraocular tension of pressure applied to the eyeball.** Amer. Jour. Ophth., 1938, v. 21, Jan., pp. 34-39.

Cattaneo, D. **Transitory blindness due to retinal arterial hypertension.** Ann. di Ottal., 1937, v. 65, Feb., p. 81.

Graefe in 1861 first recorded a case of transitory blindness due to spasm of the retinal arteries, but only recently has it been possible by ophthalmodynamometry with the apparatus of Bailliart to evaluate the diastolic and systolic pressures, and through the norm of Fritz to determine the degree of elasticity of the arterial walls.

The writer describes a case of acute toxemia after injection of fungi. With no eyeground changes except slight narrowing of the retinal vessels, sight in both eyes was reduced to light perception. Intramuscular injection of acetylcholin was followed by intraorbital injections of the same drug with ultimately complete restoration of vision.

Hemorrhagic retinitis is not necessarily due to sclerotic degeneration of the vessels but may result from hypertension alone as a result of arterial spasm.

As Maggiore has shown, many cases considered as retinal embolism are actually angiospasm. In 70 percent of the cases of toxicosis, angiospasm occurs. A certain form of central retinitis is dependent on dystonia of the vegetative system. Retinal angiospasm is grouped under three heads, the rapidly developing acute form, the retrobulbar type of Redslob, and the slowly progressive cases simulating Abadie's optic nerve atrophy. The author discusses the importance of diagnosis, prognosis and therapy of angiospasm in its relation to retinovascular hypertension. (Bibliography.) Park Lewis.

Churgina, E. A. **Posterior detachment of the vitreous and its diagnosis.** Viestnik Opht., 1937, v. 11, pt. 1, p. 13.

A review of the literature, with particular detail as to Lindner's work. With Koeppe contact glass, Chapski microscope, and arc-light illumination the author examined 39 cases of retinal detachment. In 17 she found detachment of the vitreous. Of 32 highly myopic eyes with fundus changes detachment of the vitreous was found in nine. Bilateral vitreous detachment was found in three old patients with normal refraction. The author believes that retinal detachment, vitreous detachment, and senile chorioretinal changes are manifestations of degenerative processes in the eye. Her findings do not support Lindner's contention that vitreous detachment is the cause of retinal detachment. Ray K. Daily.

Dashevskii, A. I. **A new method of localization of fundus changes and their projection on the sclera.** Viestnik Opht., 1937, v. 10, pt. 6, p. 798.

A very exhaustive critical review of the various localization procedures for retinal holes. Accuracy of localization is the sine qua non of a good surgical result. The author's own method consists in localizing the area by ophthalmoscopic perimetry, and projecting it on the sclera by mathematical calculation based on the central angles as determined by the perimeter, and the meridian in which the tear lies. The author has devised a ring with an indicator which, applied to the limbus, simplifies exact localization of the spot. (Illustrations.) Ray K. Daily.

Denti, A. V. **The syndrome of Groenblad and Strandberg, or angioid striae in the retina with Darier's pseudoxanthoma elasticum.** Ann. di Ottal., 1937, v. 65, Feb., p. 93.

Since in 1929 Groenblad and Strandberg found this retinal condition associated with Darier's pseudoxanthoma elasticum, about one hundred such cases have been described, some having

the degenerative skin lesions and others without. The author presents a typical case, and reviews the literature as to pathogenesis, biochemistry, and probably etiology. He does not believe that the frequent association of retinal hemorrhages with pseudoxanthoma elasticum is a fortuitous phenomenon; but rather that the same degenerative changes affect the skin, the elastic tunic of the eye vessels, and the membrane of Bruch. He considers heredity to be a causal factor; and that consanguinity, if looked for, might have been discovered in a larger number of the cases reported. (2 plates, bibliography.)

Park Lewis.

Fabian, G. and Georgariou, P. **The pathogenesis of genuine arteriosclerotic retinopathy.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 499.

The retinopathy due purely to essential hypertension and produced mechanically instead of resulting from toxemia, as the somewhat similar retinal changes associated with nephritis and diabetes probably are, has certain definite characteristics. The changes are predominantly peripheral in the form of spots of exudation of blood constituents from the capillaries along the course of retinal vessels, and not mere simple unspecific opacities. The optic disc is normal in all but advanced stages. The vessels have very irregular reflexes as a manifestation of extreme variation of the lumen. The color of the vessels is less characteristic and important. The vessels are distinctly narrow and surely not as a result of transient spasm. Tortuosity of vessels and the crossing phenomenon are of subsidiary importance. Of extreme importance are the peripheral white spots of presumably lipoid exudate which distinguish the retinopathy of essential hypertension from albuminuric retinitis. Often, too, slight pigment changes occur in the fovea.

In twelve patients who exhibited this characteristic ophthalmoscopic picture, general arterial hypertension and increased blood cholesterin content were demonstrable. Blood cholesterin is subject to wide normal variations and hypertension alone does not always produce similar changes; but it seems likely that the constant association of the two factors in the authors' patients, together with evidence of definitely damaged vessels, is presumptive evidence that the peripheral patches are a cholesterin transudate. The author suggests the name "arteriosclerotic cholesterin retinopathy." F. Herbert Haessler.

Farina, Ferdinando. **Etiology and pathogenesis of retinosis pigmentosa.** Rassegna Ital. d'Ottal., 1937, v. 6, July-Aug., p. 477.

In this article the author restates his views upon the origin of retinosis pigmentosa, maintaining that it depends upon an endocrine disturbance. He attempts to show that the recent work of Schupfer (see Amer. Jour. Ophth., 1938, v. 21, p. 235), who considers that the condition arises from embryogenetic causes, is incorrect, or at least incompatible with his own views.

Eugene M. Blake.

Gasteiger, H. **Histologic findings in the eye in patients with anomalies of kidney and blood pressure.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 604.

The histologic findings in the eyes of ten patients are described in detail individually and an extensive summary of the findings arranged according to tissue system is presented. It is clear that there is no support for the belief that the retinal lesion is inflammatory

in origin, and a widespread arteriosclerosis is demonstrable. It is, however, debatable whether this vascular change is the cause of the retinal lesion and in this the author agrees with Kyrieleis. The arteriosclerosis does not seem sufficiently extensive or regular in distribution, particularly in the choroid. The choroidal and retinal lesions are not interdependent, but are equivalent independent sequelae of a nutritional disturbance.

Gasteiger's findings do not give support to Koyanagi's belief that changes in the pigment epithelium at the posterior pole are important in the genesis of the retinal lesion. The retinal lesions are not limited to the posterior pole and often there is widespread involvement of the vessels of the anterior uvea.

The author believes morbid changes exist in the entire vascular system of the eye and that they are preceded by functional states which lead to disturbances of nutrition. The various parts of the eye may be involved in different ways and in a variety of sequences.

F. Herbert Haessler.

Gibson, G. G. **The clinical significance of the retinal changes in the hypertensive toxemias of pregnancy.** Amer. Jour. Ophth., 1938, v. 21, Jan., pp. 22-31.

Ivanov, H. K. **Embolism of the central retinal artery.** Viestnik Opht., 1937, v. 11, pt. 1, p. 97.

A report of three cases: one of true embolism; one of prolonged angiospasm; and one a rare case of bilateral obstruction caused by sclerosing endarteritis, the left eye involved first, and the right eye suffering a similar attack nine days later.

Ray K. Daily.

Jeandelize, R. B., and Gault, A. **Operative statistics obtained in treatment of retinal detachment by diathermo-coagulation.** Bull. Soc. Franç. d'Opht., 1936, v. 49, pp. 269-280.

Using Weve's method of diathermocoagulation, the authors studied the results of 122 operations done on 119 patients. The results are shown by curves and tables. The causes of success and failure are given. Relapses and recurrences are discussed.

Clarence W. Rainey.

Koyanagi, Y. **The rôle of retinal angiospasm in the genesis of albuminuric retinitis.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 93.

In this critical essay, which does not record any new material, the author emphasizes two points. It is probable that quinine amblyopia is primarily the result of angiospastic interference with nutrition of the retina, and equally likely that we must seek another cause than ischemia as the cause of albuminuric retinitis.

The Salus crossing-phenomenon does not serve to distinguish the two classes of vascular hypertension.

F. Herbert Haessler.

Lijo Pavia, J., and Tartari, R. A. **Multiple circumscribed detachment.** Rev. Oto-Neuro-Oft., 1937, v. 12, Nov., p. 290.

Apropos of a case of acquired retinal cyst, also due to trauma, and similar to one previously reported, it is pointed out that the term cyst denotes its localization within the retina, and that, on the basis of these two cases and of pathologic examinations reported in the literature, the cyst walls are sufficiently resistant to offer a good prognosis.

M. Davidson.

Malbran, J., and Adrogué, E. **Congenital folds of the retina.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Aug., p. 500.

To the 28 cases found in the literature and reviewed, the authors add three of their own seen in the course of one year. One had nystagmus, one presented convergent strabismus, the third exhibited only low myopia. In all three cases the folds started from the papilla, and in one case the fold was double. In one of the cases there was a persistent canal of Cloquet separate from the fold. Ida Mann's supposition that the cause of the malformation is an adhesion between the primary vitreous and the internal layer of the optic vesicle is considered most probable. (Illustrated.)

M. Davidson.

Nastri, Francesco. **Contribution to the genesis of idiopathic retinal detachment.** Rassegna Ital. d'Ottal., 1937, v. 6, July-Aug., p. 402.

The author describes two cases of retinal separation in which small retinal hemorrhages with surrounding edema were observed in a quadrant of the retina, which a little later showed a tear. The third case was one of retinal tear without separation, in which the presence of floating bodies in the vitreous and visual disturbance of a few days standing suggest that a hemorrhage had occurred. Nastri considers these cases very significant in the pathogenesis of idiopathic retinal detachment, and feels that at least in some cases the principal factor may reside in the retina itself. Eugene M. Blake.

Spadavecchia, V. **Effect of the water load on general arterial pressure and on ocular tonus.** Ann. di Ottal., 1936, v. 64, Sept., p. 611; and 1937, v. 65, March, p. 194.

The aim of the experiments was to obtain such variations in arterial pressure by dilution of the blood stream as might be accomplished without injury to the patient. The author studied the variations of humeral arterial pressure, systolic and diastolic, after ingestion on twelve successive days of 1,500 c.c. of water taken between 8 and 8:30 a.m. The patients had a wide variety of ocular diseases such as chronic simple glaucoma, trachomatous pannus, retinal hemorrhage, optic atrophy with iritis, absolute glaucoma, acute glaucoma, and nuclear cataract. The tonometric changes seemed dependent upon the condition of the intraocular arteriocapillary system.

The author concludes that between the general arterial circulation and blood stream on the one hand, and the cavity of the eye and the fluids which it contains on the other hand, there exists a direct relationship which he terms the "endocular threshold" or the "ocular-tonus threshold." The physiologic level ordinarily maintained is disturbed under varying morbid conditions, which have a special influence on the intraocular arteriocapillary system. (13 graphs, bibliography.) Park Lewis.

Suganuma, Sadaaki. **Studies of the blood pressure in the central artery of the retina. 3. Pressure in normal pregnancy and toxemia of pregnancy.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 637.

In twenty pregnant women, measurements were made of general blood pressure with a Tycos mercury sphygmomanometer, intraocular tension with a Schiötz tonometer, and retinal vascular pressure with his own dynamometer.

It was not uncommon to discover slight to moderate increase of the arterioretinal pressure in the last two or three months of pregnancy. This

cephalic hypertension is reduced to normal soon after delivery.

In toxemia of pregnancy in previously normal primiparae, an increase of arterioretinal pressure is the earliest sign and probably the only indispensable preëclamptic sign. After delivery, the pressure returns to normal with the general hypertension. In toxemia in multiparae who have previously had preëclamptic or nephritic hypertension, the pressure is still high one month after delivery. F. Herbert Haessler.

Tertsch, Rudolph. **Three cases of forcible separation of the limiting membrane of the vitreous.** Zeit. f. Augenh., 1937, v. 93, Oct., p. 121.

In the vitreous of three eyes were seen cystic bodies not due to entozoa. In the first case a large cyst looked much like echinoccoccus and only the absence of general confirming manifestations led to correct diagnosis. Actually the cyst was found to be secondary to changes induced by a tuberculous lesion of the retina, presumably perforation of a lymph vessel. In the second patient, a smaller cystic cavity followed a preretinal hemorrhage, and in the third an inflammatory exudate produced a vesicle with tense glistening strands radiating into the vitreous.

F. Herbert Haessler.

Volhard, Franz. **The question of the pathogenesis of angiospastic retinitis.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 600.

Volhard reminds Koyanagi that it is not sound to try to explain one unknown by means of another. So quinine may be primarily toxic to retinal elements. Further, Koyanagi seems to believe that angiospasm is not the primary occurrence of the retinitis, but the two always occur together and are genetically coördinated. Sometimes the angiospasm starts after the retinitis is well developed. Volhard believes that the retinitis is not a local independent disease but merely a manifestation of a general hypertension or kidney pathology.

This problem has been studied by Volhard since 1905 and in countless nephritics the consulting oculists have assured him that frank retinitis albuminurica was associated with thinning, often extreme, of the retinal vessels. When now and again the larger trunks seemed normal, the smaller arterioles were thinned. More often than not the vascular changes preceded the retinal.

In the second place the retinitis ascribed to uremia is often seen at a time when the renal function is still relatively good.

The third and most important observation is that the retinitis is not necessarily associated with albuminuria, azotemia, cholesterinemia, or even hypertension, but with the particular hypertension distinguished by him as "pale" in contradistinction to red. In genuine senile hypertension, angiospastic retinitis is frequently absent. In pale hypertension—characterized by pallor of the skin and kidneys, ischemic circulation in the dermal capillaries, high diastolic pressure, and tendency toward angiospastic retinitis—one must assume a generalized contraction of the entire arterial system, presumably ascribable to a hematogenous chemical-pressure mechanism.

F. Herbert Haessler.

Weve, H. J. M., and Fischer, F. P. **Proteolytic ferments in the subretinal fluid of retinal detachment.** Arch. f. Augenh., 1937, v. 110, Nov., p. 260.

The subretinal fluid in retinal detachment due to tear contains a fibrin-dis-

solving substance, protease. It takes its origin from the vitreous, for this is the only organ in the eye which has a strong fibrin-dissolving property. The action of protease depends on the hydrogen-ion concentration of the fluid. The retina, because of its lipoid content, may inhibit the action of protease in a hydrogen-ion concentration of 7.6 to 6.8. The importance of protease in the subretinal fluid may be deduced from the following observation: Two cases of retinal detachment, in which the protease was abundant in the subretinal fluid, had to be operated on several times before reattachment of the retina was achieved, although the tears were always accurately approached and well coagulated. A third case in which the protease was very low, but the retinal tear was exceedingly large, healed promptly after the first operation notwithstanding the fact that the tear could not be accurately or successfully coagulated. R. Grunfeld.

Weve, H. J. M., and Van Manen, J. G. **Technique and results of diathermy treatment of detachment of the retina in 1935.** Bull. Soc. Franç. d'Opht. 1936, v. 49, pp. 281-287.

By the method of combined surface and perforating coagulation. the authors achieved cures in 75 percent of 76 cases in 1934 and 75 percent of 124 cases in 1936. The preoperative precautions include: indirect ophthalmoscopy with a +20 D. lens and strong light; a sketch of the entire fundus according to the scheme of Amsler and Dubois; and search for tears, to increase the chance of cure by the first intervention and to make possible the use of the least possible amount of diathermic energy. Operative details include: localization of the tear by transillumination; pyrometer control by surface-coagulation readings; fixation of the margins of the tear by the perforating cautery, which touches the retina; and surface coagulation in the field of the vascular and degenerative lesions to prevent recurrences. The patient must then rest in bed for fourteen days with a binocular bandage, afterward wearing Lindner's stenopeic spectacles. Clarence W. Rainey.

11
OPTIC NERVE AND TOXIC AMBLYOPIAS

Dimshitz, L. A. Kaliamina, A. A., Liukova, L. H., and Rapoport, K. H. **The differential significance of dark adaptation in neuritis and choked disc.** Viestnik Opht., 1937, v. 11, pt. 2, p. 176.

The objective was to verify Behr's contention that adaptometry is valuable in the differential diagnosis of diseases of the optic nerve. Dark adaptation was measured in thirty patients with various diseases of the optic nerve. The conclusions are that adaptometry elicits additional information on the ocular functions, but has no absolute significance as to differential diagnosis.
Ray K. Daily.

Hoehne, H. **Papilledema with hypotony of the eye.** Zeit. f. Augenh., 1937, v. 93, Oct., p. 133.

It is generally accepted that papilledema with increased intracranial pressure is mechanical and not inflammatory in origin. Some authors, however, still believe that papilledema associated with perforation of the globe results from an inflammatory process. Hoehne describes two observations in which papilledema in perforated globes could clearly not be ascribed to infection but doubtless resulted from mechanical pressure-relationships.
F. Herbert Haessler.

Kahoun, S. **Eye injured by CO poisoning.** Ceskoslovenska Ofth., 1937, v. 3, no. 2. pp. 122-125.

The author describes a case of carbon monoxide poisoning, manifested in the eyes by paralysis of the muscles and by optic neuritis; these symptoms occurred two days after breathing large amounts of CO. Later, the levator of each upper lid became involved. The patient recovered in twelve days.

Georgiana D. Theobald.

Langhammerova, Rosalie. **Blood pressure in tabetic optic-nerve atrophy.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 101-108.

Of 153 cases of tabes, 59 had optic atrophy, of which fourteen had hypertension and four hypotension. Under fever and specific treatment three hypotension and six hypertension cases were improved, whereas two hypertension cases became worse. Treatment was without effect in six of the hypertension cases and in one hypotension. The retinal blood pressure and the intracular pressure were not measured, hence these results could not be compared with those of Lauber. In general no relation has yet been discovered between blood pressure and optic neuritis.

Georgiana D. Theobald.

Michal, F. V. **Two cases of methyl-alcohol toxemia.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 116-121.

The author observed two cases of poisoning from methyl alcohol. In the first case the patient had drunk the alcohol on an empty stomach and had not vomited. The perimetric findings were characteristic, and so also was the oscillation in visual acuity. On arriving at the hospital the patient saw only hand movements with the right eye, and the left was blind. After fourteen days the right vision was 6/36, the left 6/60. A month later the right eye recognized fingers at a distance of 0.5 meter while the left was blind. The therapy was fever treatment with milk injections and sufrogelin.

The second case ended with the same visual acuity in both eyes; fingers at 1.5 meters. The quantity of methyl alcohol absorbed was 60 c.c. The patient vomited 24 hours later, from acute gastritis. The therapy was repeated lumbar puncture, and detoxicating treatment. (Devenan's detoxine)

Georgiana D. Theobald.

Schieck, F. **The question of the origin of choked disc.** Graefe's Arch., 1937, v. 138, pts. 1 and 2, p. 48.

An open connection between the intervaginal space of the optic nerve and the tissue spaces around the central retinal vessels does exist. The author is unable to find any opening between the intervaginal space and the orbit at the entrance of the central retinal vessels into the dura. Both these findings are contrary to those of Carl Behr.

H. D. Lamb.

12

VISUAL TRACTS AND CENTERS

Balado, M., and Franke, E. **Chiasmal changes in arachnoiditis of the chiasm.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Oct., p. 618.

Serial sections of a case of chiasmal arachnoiditis lead the authors to the following conclusions: There exists a process of inflammatory origin confined to the chiasmal cistern and determining a bilateral optic atrophy. Its evolution is by various stages. The optic atrophy is the result of the extension of the arachnoiditis to the chiasm and optic nerve. The most appropriate therapy is surgical removal of the arachnoid as the

source of involvement of the visual pathways, and to provide access of the cerebrospinal fluid to them. (Illustrated.) M. Davidson.

Jebavy, Jan. **Case of cephalic tetanus.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 126-130.

The right upper lid of the patient was injured with a sharp instrument. Cephalic tetanus developed. The first symptoms were nuclear paralysis of the right oculomotor nerve, and partial paralysis of the same nerve of the left eye. Paralysis of the right trochlear nerve also occurred. Complete recovery.

Georgiana D. Theobald.

Rubino, A. **Adenoma of the hypophysis with optic-chiasmatic arachnoiditis.** Boll. d'Ocul., 1937, v. 16, Aug., p. 808-829.

A woman of 46 years, affected for about six years with violent frontal headaches, had noted for two years a blurring of vision at the temporal side of the visual field, and a defect of central vision more marked toward the left. Examination showed bitemporal hemianopsia with vision of 7/10 in the right eye and counting fingers in the left eye, and a pallor of the temporal halves of the discs. The sella was enlarged. On a diagnosis of hypophyseal adenoma the patient was operated upon for hypophysectomy by the transfrontal route. Histologic examination of the tumor showed it to be an adenoma, and examination of a fragment of the arachnoid showed a reactive process in its components. The chiasmatic syndrome disappeared, but a short time later there was partial relapse of the ocular symptoms of the left eye, which the writer attributes to a relapse of the arachnoidal process. (Bibliography, 9 figures.) M. Lombardo.

13

EYEBALL AND ORBIT

Besso, M. G. **Acute orbital edema and optic atrophy following administration of potassium iodide.** Rassegna Ital. d'Ottal., 1937, v. 6, July-Aug., p. 381.

Besso's patient was a 37-year-old woman who had had lues for ten years and who developed an osteo-periostitis of the right upper orbital margin. She was resistant to mercury, and arsenicals induced heart attacks. Following administration of two grams of potassium iodide in 24 hours she presented not only the usual symptoms of iodism but marked orbital edema, with exophthalmos and blindness. There was also a dacryoadenitis with ulceration and infiltration of the cornea. Later, when the fundi could be seen, the optic nerves were found atrophic. This is explained as being the result of the extreme exophthalmos and compression of the vessels in the orbit. Eugene M. Blake.

Lebedev, A. A. **Myelogenous chloroma.** Viestnik Opht., 1937, v. 11, pt. 2, p. 195.

A report of a fatal case in a young boy of thirteen years who sought medical assistance because of bilateral exophthalmos. (Illustrations.)

Ray K. Daily.

Malbran, J., and Oribe, M. **On orbital mucoceles.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Sept., p. 575.

Mucoceles constitute one eighth of all orbital neoplasms, and occur mainly after 25 years of age. Aside from the exophthalmos and ptosis, no serious changes have been noted, except retinal folds, and as to the fields a depression of the internal and a widening of the external isopters, with central and paracentral scotomata. X-ray diagnosis is facilitated by injection of neolipiodol.

The surgical approach preferred is the external or orbital one, because it reduces the exophthalmos immediately, is not complicated by infection, and eliminates recurrences. (Illustrated.)

M. Davidson.

Mikaelian, P. X., and Aronoff, D. M. **Schwartzmann's phenomenon in the eye.** Viestnik Opht., 1937, v. 11, pt. 1, p. 55.

The objective of this experimental study was to demonstrate the effect of intravenously introduced toxins on previously sensitized ocular tissues. The filtrates of the typhus bacillus and the Breslau bacillus were injected into the conjunctiva, cornea, and vitreous of rabbits. Twenty-four hours later the rabbits were given an intravenous injection of the filtrates. In some cases hyperemia and edema were found at the site of the conjunctival injections, showing that the intravenous injection stimulated a pathologic process at a focus of diminished resistance. This reaction was accentuated by adding to the intravenous injection 50 percent urotropin, which apparently weakened the hemato-ophthalmic barrier. The phenomenon was negative for cornea and vitreous body. In hungry animals the reaction as well as the accentuating effect of urotropin were less marked. (Illustrations.) Ray K. Daily.

Sverdlov, D. I. **Individual ocular prothesis.** Viestnik Opht., 1937, v. 11, pt. 1, p. 120.

To obviate journeys to large centers to obtain well-fitted artificial eyes, the author advises that an artificial model of dental splint, made by the oculist and colored by an artist, should be sent to the factory for manufacture of a glass eye. Ray K. Daily.

Titov, I. G. **A rare case of thrombosis of the cavernous sinus.** Viestnik Opht., 1937, v. 10, pt. 6, p. 888.

A report of a fatal case of bilateral cavernous sinus thrombosis caused by gonorrheal prostatitis, with a secondary gonococcopyemia. Ray K. Daily.

14

EYELIDS AND LACRIMAL APPARATUS

Agnello, F. **Contribution to the knowledge of rare anomalies of the lacrimal passages.** Boll. d'Ocul., 1937, v. 16, Aug., pp. 880-888.

The author reports the case of a stone-cutter 35 years of age, who for a couple of years on blowing his nose showed a forced return of lacrimal fluid from the lower punctum, accompanied by a peculiar noise provoked by passage of air forcibly through the narrow canaliculus. To explain the pathogenesis of the phenomenon the author assumes the presence of some affection of the mucous membrane of the lacrimal duct. (Bibliography.) M. Lombardo.

Agnello, Francesco. **Two cases of oriental button, cured by surgical diathermy.** Rassegna Ital. d'Ottal., 1937, v. 6, May-June, p. 303.

Agnello reports two cases of leishmaniosis (oriental button, aleppo button) occurring in two subjects from the same community. Both had done military duty in the orient within a few months. In one case the lesion was situated directly over the lacrimal sac and resembled a peridacryocystitis. The other occurred upon the cheek and was not unlike psoriasis. The only treatment used was diathermy-coagulation and the results were lasting and left little deformity. The author describes the diffuse clinical aspects of the disease, its pathology and prophylaxis. (3 figures.) Eugene M. Blake.

Alvaro, M. E., and Sampaio Doria, A. **Congenital fistula of the lacrimal gland.** Rev. Oto-Neuro-Oft., 1937, v. 12, Nov., p. 283.

A rare case of a congenital fistula, above and outside of the external canthus, discharging a clear apparently lacrimal fluid in a child of three years. The discharge became more abundant when the child cried or lacrimation was stimulated otherwise. X ray with lipiodol indicated a connection with the lacrimal gland. After failure to destroy the fistula by actual cautery, an attempt was made to dissect the canal intact and implant it into the upper conjunctival sac. But the fistula reverted externally to the original opening, and was obliterated by excision of the whole track-bearing subcutaneous tissue, in which the pathologist reported failure to find glandular elements. The case is believed, therefore, to have been one of aberrant gland deeply situated and connected with the normal gland.

M. Davidson.

Ascher, K. **Appearance and disappearance of the Marcus-Gunn "jaw-winking" phenomenon during regression of a luetic ptosis.** Med. Klinik, 1937, v. 33, Sept. 17, pp. 1259-1261.

The jaw-winking phenomenon is most often associated with congenital ptosis. These cases have been explained by an abnormal, preformed connection of the levator nucleus with other nuclei. There are, however, two groups of cases for which this explanation cannot hold. One consists of those cases in which the phenomenon is isolated, without oculomotor disturbances, while the other group consists of very rare cases in which the phenomenon arises in the course of life and is only temporary. The author reports one case belonging to this latter group. He and a number of neurologists emphasize the existence of phylogenetically or ontogenetically preformed group-innervations, normally present in primitive man, and still functioning in many animals. Normally these complex innervations are only potentially present, but they may actually begin to function under pathologic conditions of one or more innervation centers.

Bertha A. Klein.

Ballaban, Karol. **Two cases of actinomycosis of the lacrimal canals.** Klinika Oczna, 1937, v. 15, pt. 4, p. 431.

Two clinical reports. The interesting feature of one case was limitation of the affection to the lacrimal canal, in spite of the presence of a corneal erosion caused by a senile ectropion, and of the fistulating cicatrix of a former glaucoma operation. Recovery was rapid, following curettage of the canals and irrigation with Lugol's solution.

Ray K. Daily.

Fain, I. E. **Treatment of meibomian blepharitis and keratitis.** Viestnik Opht., 1937, v. 10, pt. 6, p. 892.

The author gets immediate results from massage of the lids.

Ray K. Daily.

Kiparisov, N. A. **An operation for cicatricial entropion of the lower lid.** Viestnik Opht., 1937, v. 11, pt. 2, p. 223.

The operation consists in shortening the skin of the lower lid by excision of a strip 0.5 to 1 cm. wide, and in changing the direction of the deformed tarsus by sutures introduced in such a manner that the upper edge of the tarsus is turned out. (Illustrations.)

Ray D. Daily.

Lazarev, E. G. **A new surgical modification for ptosis.** Viestnik Opht., 1937, v. 11, pt. 1, p. 76.

The basis of the author's operation is shortening of the tarsus by partial excision through a conjunctival incision. (Illustrations.) Ray K. Daily.

Lotin, A. V. **A case of successfully removed basal cell carcinoma of the lid.** Viestnik Opht., 1937, v. 10, pt. 6, p. 891.

A recurrent chalazion was found on microscopic examination to be a basal-cell carcinoma. Radical excision with plastic repair gave a satisfactory result. Ray K. Daily.

Mikulicz, J. **Concerning a peculiar symmetrical disease of the lacrimal and salivary glands.** Medical Classics, 1937, v. 2, Oct., pp. 165-186.

This is a translation into English of Mikulicz's original paper, published in the Berliner klinische Wochenschrift, 1888, and upon the basis of which Mikulicz's name was first applied to the disorder referred to.

Nicolato, A. **175 cases of dacryocystitis operated on by the Dupuy-Dutemps method.** Boll. d'Ocul., 1937, v. 16, Aug., pp. 781-792.

The author describes his modification of the original Dupuy-Dutemps dacryocystotomy, with which he got 97.5 percent of successes and 2.5 percent good results; whereas in cases operated on by the original method he got 89.63 percent successes, 7.37 percent good results, and 2.96 percent failures. In discussion of the surgical aspect of the affection the writer comes to the following conclusions: Systematic extirpation of the sac is a practice to be rejected because of its mutilating effect, this radical procedure being indicated only in those cases in which the condition of the sac is such that conservative procedures cannot be effected. Dacryocystostomy is efficient as preparatory to intraocular surgical procedures. (Bibliography, 8 figures.) M. Lombardo.

Pokhisov, N. **A new surgical procedure for eversion of the lacrimal punctum and mild ectropion of the lower lid.** Viestnik Opht., 1937, v. 11, pt. 2, p. 218.

The procedure consists in excision of a triangular piece of conjunctiva below the lacrimal punctum, and a strip along the border of the inner half of the lid. The author was pleased with the results in 25 cases. (Illustrations.) Ray K. Daily.

Schornstein, T. **A contribution to plastic surgery of the lower lid (with special consideration of the management of lid carcinoma).** Arch. f. Augenh., 1937, v. 110, Nov., p. 549.

A description of the author's method of covering the coloboma of the lower eyelid (after extirpation of carcinoma) with a broad-based skin-flap taken from the region of the cheek and temple. R. Grunfeld.

Sobanski, Janusz. **A spectacle prothesis for blepharospasm.** Klinika Oczna, 1937, v. 15, pt. 4, p. 423.

The author describes a device consisting of two arms of iron wire covered with rubber and joined to the bridge of the spectacles. It is similar to ptosis spectacles. (Illustrations.) Ray K. Daily.

Tikhomirov, P. E. **An operation for eversion of the lower lacrimal punctum.** Viestnik Opht., 1937, v. 11, pt. 2, p. 216.

The operation consists in the excision of a rhomboidal strip of conjunctiva from the border of the lid in its nasal half. (Illustrations.) Ray K. Daily.

15
TUMORS

Bossalino, Giuseppe. **Tumors of the iris and ciliary body.** Rassegna Ital. d'Ottal., 1937, v. 6, July-Aug., p. 438.

The author passes in review the bibliography of the subject and reports two cases of iris tumors which spread to the ciliary body. The first and larger tumor was observed in a 46-year-old man and was classified as an endothelial tumor. The entire endothelial tissue of the iris had contributed to its origin and development. The second case, arising in a 30-year-old woman, was a sarcoma of polymorphous cells and fasciculated structure. The growth extended to the circular fibers of the ciliary body, an unexpected finding, since careful examination before operation indicated a tumor confined to the pupillary portion of the iris. The author stresses the importance of enucleation in cases of iris tumor which are considered malignant. (8 figures.) Eugene M. Blake.

Brendel, Joseph. **The difference in penetration of the sclera between primary melanosarcoma and metastatic carcinoma of the uvea.** Arch. f. Augenh., 1937, v. 110, Nov., p. 559.

By reviewing the respective literature and by study of his own material, the author concludes that metastatic carcinoma more often penetrates the sclera along the sheaths of the posterior ciliary nerves than is the case with sarcoma. Among 47 metastatic carcinomatous cases the carcinoma penetrated from the uvea through the sclera, in fourteen cases along the sheaths of the vessels, and in fourteen other cases along the sheaths of the nerves. Among 41 uveal sarcomas the penetration occurred 29 times. In 26 instances the sarcoma penetrated the sclera along the sheaths of the vessels and only in three instances along the sheaths of the nerves. R. Grunfield.

Cassuto, Nathan. **So-called papilloma of the bulbar conjunctiva.** Boll. d'Ocul., 1937, v. 16, April, pp. 413-424.

A man of 46 years had been affected for thirteen years by a slowly growing new formation of the nasal conjunctiva of the left eye. Situated between the caruncle and the limbus, it was oval in shape and of reddish color, with an uneven surface. It was 7 mm. long, 4 mm. wide, and 3 mm. thick. Histologic examination showed it to be a primary papilloma of the bulbar conjunctiva. (Bibliography, 4 figures.)
M. Lombardo.

Collenza, Domenico. **Divided pigmentary nevi of the lids.** Boll d'Ocul., 1937, v. 16, April, pp. 435-460.

A woman nineteen years old had shown since birth a slowly growing brown nevus, now hemispheric in shape and occupying the external two thirds of the right upper lid. A smaller nevus was present in the corresponding section of the lower lid, so that on closing the lids they formed a round mass divided by the palpebral fissure. Under the microscope the neoplasm appeared to be a benign melanoblastoma. A man of 26 years had shown since birth a pigmented nevus on the outer half of the right upper lid, and a similar, smaller one in the corresponding section of the lower lid. The two neoplasms were easily movable and were covered by hairs. The embryogenesis of these nevi and of their pigment is discussed at length. (Bibliography, 14 figures.) M. Lombardo.

Fleischhanderl, Arthur. **Metastatic lid tumors.** Zeit. f. Augenh., 1937, v. 93, Sept., p. 31.

Clinical findings in two patients with metastatic lid carcinoma are reported. In one of them the primary tumor was in a bronchus. In the other there were multiple lung metastases as well, but the primary mass was not found.

F. Herbert Haessler.

Knapp, P. **Question of lasting cure of retinal glioma by roentgen radiation.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 527.

Comment on article by Hans Scheyhing (see Amer. Jour. Ophth., 1937, v. 20, p. 1180).

Kurz, Jaromir. **Tumor of the ciliary body.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 140-147.

The author reports two cases examined histologically, where the tumor of the ciliary body was composed of two portions, one intraocular and the other epibulbar, right on the edge of the cornea. These two parts were separated from one another by a narrow strip of tumor cells in the sclera. It was impossible, even histologically, to decide with certainty which of these two parts was primary. In the epibulbar part some of the cells were decidedly younger than in the intraocular part.

The author indicates the difficulty of diagnosing epibulbar sarcoma. He points out the possibility of tumor continuity even when the most careful clinical study of the inner eye fails to trace it. Georgiana D. Theobald.

Lisch, Karl. **The participation of the eye in neurofibromatosis (Recklinghausen), particularly the occurrence of iris nodules.** Zeit. f. Augenh., 1937, v. 93, Oct., p. 137.

In three patients with neurofibromatosis, iris nodules were seen. In two of them, very numerous rounded nodules of varying size more densely pigmented than the normal parts of the iris were noted as the only ocular lesion. The third patient had a conjunctival nevus which extended over the lower third of the cornea, numerous iris nodules, and bilateral papilledema with hemorrhages at the papillary margin and signs of incipient atrophy. The visual acuity was reduced to 1/20 and there was binasal hemianopia. Roentgenologic pictures of the head gave further evidence of tumor in the region of the optic nerves and chiasm.

Doubtless the iris tubercles, conjunctival and corneal lesions, and optic nerve growths were tumefactions homologous to the neurofibromata of the skin. F. Herbert Haessler.

Oribe, Manuel. **Orbital air injection for diagnostic purposes.** Arch. de Oft. de Buenos Aires, 1937, v. 12, July, p. 458.

Retroorbital injection of from 15 to 30 c.c. of air by means of a stout 10-cm. needle introduced along the outer orbital margin has been found very valuable in differential diagnosis by X ray between encapsulated and infiltrating orbital tumors. The procedure is painless and innocuous, and the exophthalmos disappears in 48 hours. Care should be taken not to puncture the conjunctival sac or to introduce the needle into the tumor itself. The advantages in clearly outlining size, topography, and location of the pedicle are illustrated by films without and with air injection. M. Davidson.

Papolczy, F. **The prognosis of uveal sarcoma.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 518.

The author analyzes the records of 112 patients with uveal sarcoma followed from 5 to 25 years. His statistics

agree well with others published, and there is no reason for changing our indications for operations in cases of sarcoma. The eye must be enucleated at a time when the organism as a whole can still cope with the tumor cells that gain access to the blood stream. Exenteration is only indicated when the tumor has perforated the globe and given rise to proliferations in the orbit visible at the time of enucleation.

F. Herbert Haessler.

Prevec, S. **A case of sarcoma of the nerve head.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 513.

The author describes the clinical and histologic characteristics of an eye in which a sarcoma primary about the nerve head proliferated into the latter and finally developed into a larger secondary globular mass which had more than twice the diameter of the optic nerve and projected into the vitreous cavity. F. Herbert Haessler.

Puscariu, Elena. **Voluminous nevocarcinoma of the eyebrow region.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n.s., July, p. 601.

Morax studied 126 cancers of the lids found among 147,000 patients. Of these two only were nevocarcinoma. In the author's collection of 7,000 notes, five of nevocarcinoma of the conjunctiva were found, three of which were pigmented and three nonpigmented. She reports the case of a patient fifty years old who had had a small brown semipigmented nevus of the skin above the right eyebrow, measuring from 5 to 6 mm. This remained stationary until three months before observation, when the lesion grew very rapidly and at the time of examination presented a large fungating semipigmented mass. The central area was ulcerated and covered with necrotic tissue and purulent material. The tumor was firm and solidly fixed to the underlying bone, and was painful on pressure. There was a large preauricular adenitis on the side affected. The new growth and the preauricular gland were excised and were studied histologically. The microscopic characteristics of this tumor, seen in nevocarcinoma, include polymorphous cells with large protoplasmic bodies, gaint cells, well defined acidophilic nucleolus, thinly sheathed capillaries, and lymphocytic reactions. These tumors have their origin in a congenital nevus, sometimes slightly pigmented, the elements of which have lost the ability to manufacture pigment. Projecting appearance and rapid development are further striking characteristics. Derrick Vail.

Russo, Antonio. **Neuroepithelioma of the retina with an exceptional picture.** Boll. d'Ocul., 1937, v. 16, Sept., pp. 930-947.

A boy of nine years, with a history of traumatic dislocation of the right lens sustained three years previously, became affected by recurrent hemophthalmos and no light projection or perception. The enucleated eye showed in the temporal section of the retina a neoplasm having a diameter of 10 mm. and a thickness of 6 mm. The neoplasm was of grayish-yellow color, was lobulated, and showed no sharp limit. It contained three small cystic formations. Histologic description of the blastoma is given. Its origin from the retinal elements, and its morphogenesis, are demonstrated. It had originated from the neuroepithelial layer of the retina, by proliferation of the cones and rods. Thus the diagnosis of neuroepithelioma of the retina was justified, and its differentiation from glioma was evident from

the fact that the specific coloration of the glia did not show elements of such a nature. (Bibliography, 10 figures.)

M. Lombardo.

Smaltino, Michele. **Clinical and histopathologic study of the primary epithelioma of the cornea and its development.** Boll. d'Ocul., 1937, v. 16, Sept., pp. 918-929.

A boy of 14 years, several months after an attack of phlyctenular keratitis from which he had recovered, showed a flat, hard, vascular new-formed mass strictly connected with the corneal parenchyma. The surface of the mass showed numerous elevated grayish spots round or oval, some of which reached a diameter of 1 mm. On the diagnosis of epithelioma of the cornea the eye was enucleated. Histologic examination of the mass confirmed the clinical diagnosis. A rare tumor at the age of this patient, it confirms the opinion that epitheliomata may develop primarily from the cornea, and it confirms also the known law of general oncology that epithelial tumors develop frequently at transitions between the epithelial and connective tissues. (Bibliography, four figures.)

M. Lombardo.

Tichomirov, P. E., and Kopziovskaja, P. C. **Recklinghausen's disease.** Viestnik Opht., 1937, v. 11, pt. 1, p. 70.

A report of two cases, with involvement of the upper lids and nodules in the iris. (Illustrations.)

Ray K. Daily.

16
INJURIES

Barrat, P. **Localization of intraocular foreign bodies opaque to the X ray, by means of lipiodol.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n.s., July, p. 605.

Under local anesthesia 1/10 c.c. of warm 40-percent lipiodol is injected into the subconjunctival area above and below, in the vertical meridian adjacent to the limbus. This forms a small limited swelling, the concave edge being due to the convexity of the limbus. Two X-ray pictures are necessary, front view and profile. These are taken at least a half-hour after the lipiodol injection. The patient should have his eyes closed or bandaged during the X-ray procedure. The films are then calculated. This is facilitated by the concavity of the opaque lines. (Illustrations, diagrams.) Derrick Vail.

Borley, W. E., and Leef, E. **Removal of lead shot from the vitreous by use of the biplane fluoroscope.** Amer. Jour. Ophth., 1937, v. 20, Dec., pp. 1232-1237.

Bücklers, Max. **Droplet-like precipitates on the corneal surface in furniture workers.** Klin. M. f. Augenh., 1937, v. 99, Nov., p. 676.

Seven men active in the furniture industry exhibited corneal lesions similar to those in two others reported by Bücklers elsewhere. They complained of burning of the eyes and the lesion was found to consist of finest water-clear droplets on the corneal epithelium associated with minimal redness, but no reduction in visual acuity. The droplets could only be seen in retro-illumination with the slitlamp and consisted of precipitation of the solvents of lacquer and varnish used by these workers. The affection was limited to winter months when work was done with closed windows. F. Herbert Haessler.

Ciotola, Guido. **Contribution to the knowledge of argyrosis of the lacrimal passages.** Boll. d'Ocul., 1937, v. 16, June, pp. 637-653.

Clinical and histologic examination of the lower lacrimal passages, in subjects affected by argyrosis of the conjunctiva, showed a deposit of silver in the punctum, canaliculi, sac, nasal duct, and even in the nasal mucous membrane around the lower orifice. The silver pigment is not seen in the epithelium but it is abundant in the elastic fibers of the basal membrane and in the elastic tunic of the blood vessels. The argyrosis is due to passive infiltration of the granules through the intercellular spaces. (Bibliography.)

M. Lombardo.

Hartmann, Karl. **Superficial and deep disciform keratitis after exposure to hydrogen sulphide in a caisson worker on the North-Sea coast.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 456.

In six caisson workers, the author observed corneal lesions essentially like those that are known to be caused by hydrogen sulphide in chemical industries and sulphur mines. The lesions consisted chiefly of punctate defects and small vesicles, all limited strictly to the region of the lid slit and associated with reduction of corneal sensibility. The patient did not show any tendency to become resistant to an atmosphere containing hydrogen sulphide. In one patient there was a deep disciform keratitis which healed after a month, leaving scar tissue. To prevent this injury, the air must be kept free from a greater percentage of hydrogen sulphide than 0.5. Air-tight goggles are recommended. Prognosis is good.

F. Herbert Haessler.

Kiselev, P. N. **Traumatic penetration of an eyelash into the anterior chamber.** Viestnik Opht., 1937, v. 11, pt. 1, p. 125.

In an accidental perforation of the cornea a pick carried an eyelash into the anterior chamber. Not until the lash was extracted did the eye recover.

Ray K. Daily.

Kolacny, Jaroslav. **Experience with excision of prolapsed iris following traumatic perforation of the cornea, without conjunctival flap.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 85-95.

During the last two years, in the Bratislava Eye Clinic resection of prolapsed iris has been systematically done without conjunctival flap. By comparing these cases with those observed in former years, the author estimates that the time needed to rest the eyeball and insure healing, on the average, is about one third shorter. No corneal astigmatism results, and the cosmetic effect is better because there is no red strip of conjunctiva left in the scar. By omitting the conjunctival flap the operation itself is simplified and can be performed in the dispensary.

Georgiana D. Theobald.

Kolenko, A. V. **The removal of foreign-body stains with a dental burr. Viestnik Opht.,** 1937, v. 11, pt. 2, p. 233.

The author finds a small dental burr very suitable for scraping away corneal stains left after the removal of foreign bodies.

Ray K. Daily.

Lichtner, V. A. **Injury of the eye by hydrogen sulphide in the refinery.** Viestnik Opht., 1937, v. 11, pt. 2, p. 256.

The injuries caused by hydrogen sulphide usually involve the conjunctiva and occasionally the cornea. In the presence of hydrogen sulphide in the atmosphere in a concentration of 1 mg. per liter, the subjective symptoms appear at the end of the working day and reach their maximum intensity four or five hours later. In treatment dionin

affords relief, but cocaine, because of its effect on the corneal epithelium, is contraindicated. The authors urge improvement in technical equipment and construction of the plant, in order to eliminate leakage of gas and to improve ventilation. Ray K. Daily.

Rohrschneider, W. **Late ocular injury after poisoning with the war gas dichlorethylsulphite.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 447.

Dichlorethylsulphite produces a bilateral corneal opacity chiefly in the region of the lid slit. A diagnostic characteristic of great importance is the occurrence of peculiar varicose vascular dilatations in the bulbar conjunctiva. In the author's patient, symptoms developed fifteen years after the injury. Several similar experiences have been reported and the lesion is believed to be neuroparalytic. Preparations from conjunctival tissue taken for biopsy did not clarify the pathogenesis. The rarity of the observation is explained by the fact that most victims of the gas die.

F. Herbert Haessler.

Sallmann, L. **Origin of linear pigment ring of the iris.** Graefe's Arch., 1937, v. 137, pt. 4, p. 510.

The linear pigment ring on the iris first described by Šafář after penetrating injuries to the eyeball is usually present in the ciliary part of the iris and is customarily interrupted in several places. The ring may fork and a second pigmented line may run for a stretch in the form of a segment of an arc parallel to the principal ring. With the slitlamp and corneal microscope, the ring appears to be a cleft-like furrow bordered by reddish-brown pigmented edges, while in other places, or in other cases, only a curved or ring-formed pigmented streak seems to be present. In the present series, this was observed in 10 out of 28 cases examined after a vitreous fistula according to Lindner had been made because of glaucoma with very high tension. It was found that the deposit of pigment began five to seven days after operation for the vitreous fistula. The pigment lay in the region of the iris folds when the anterior chamber was very deep. In the following weeks the pigmentation became more decided, and thereafter it remained unchanged, even after about a year. The formation of a furrow is due to production of a fold in the iris when the latter sinks back after an opening through the sclera. The origin of the pigment is principally the pigment cells of the iris. H. D. Lamb.

Shagov, M. A. **Retention of an eyelash in the anterior chamber for two years.** Viestnik Opht., 1937, v. 11, pt. 1, p. 125.

A report of a case of a perforating ocular injury, in which an eyelash fixed by synechia remained in the anterior chamber for two years without causing irritative phenomena. On the basis of this observation the author believes that extraction of eyelashes from the anterior chamber is not always indicated, and that conservative treatment should be tried first.

Ray K. Daily.

Venco, Luigi. **Traumatic perforation of the macula.** Rassegna Ital. d'Otal., 1937, v. 6, May-June, p. 275.

After brief consideration of the macular changes which follow directly or indirectly upon injuries of the eyeball, the author describes a case of perforation of the macula, arising after a severe blow upon the eye by a stone. A careful and painstaking report of the fundus picture follows.

The author discusses the diverse opinions which have been expressed by numerous writers to explain the morbid picture, such as pure trauma, edema, degeneration of cells, and inflammation. He stresses the purely mechanical features, which he thinks were of greatest import in the case described. (2 figures, 1 color plate.)

Eugene M. Blake.

Wagner, R. **Trauma of a trachomatous eye from a burdock.** Ceskoslovenska Ofth., 1937, v. 3, no. 2, pp. 147-151.

Prickles from a burdock penetrated the left eye and multiple prickles were embedded in the trachomatous pannus. These were removed at different times when they came to the surface and irritated the lids. Later a Denig graft of oral mucous membrane was done, and vision improved from fingers at one foot to 5/20. Georgiana D. Theobald.

Weve, H. J. M. **Extraction of iron splinters through the sclera with a diathermy incision and localization by transillumination.** Arch. f. Augenh., 1937, v. 110, Nov., p. 646.

Since incision of the sclera with an ordinary knife is often followed by hemorrhage and retinal detachment, the author uses the diathermy knife for the incision, cutting each layer separately so that the surfaces may coagulate. He localizes the foreign body by indirect ophthalmoscopy and very strong light. He centralizes the strong light cone around the foreign body, and his assistant marks the center of the light cone as seen on the outer surface of the transilluminated sclera. Five eyes from which the foreign body has been removed by the above method have retained full vision.

R. Grunfeld.

17

SYSTEMIC DISEASES AND PARASITES

Borsotti, Ippolito. **Ocular incidents after blood transfusion.** Boll. d'Ocul., 1937, v. 16, Aug., pp. 830-860.

A woman 27 years old, after transfusion of a type of blood different from her own, had a violent hemoglobinuria and showed a right optic neuritis which terminated in atrophy. A man 34 years of age, affected by hemopathy of a leukemic type, after several transfusions became affected by retinal hemorrhages in both eyes. The writer assumes the ocular complications in the first case to be due probably to the transfusion of a blood biologically unfit for the patient. In regard to the second case he calls attention to the grave prognostic significance of the ocular complication, which frequently precedes exitus. (Bibliography, 3 figures.) M. Lombardo.

Fair, I. E. **Several cases of Charlin's nasal-nerve syndrome.** Viestnik Opht., 1937, v. 11, pt. 1, p. 124.

A report of four cases.

Ray K. Daily.

Hartman, E., David, M., and Desvignes, P. **Ocular symptoms in olfactory meningiomas.** Ann. d'Ocul., 1937, v. 174, Aug., pp. 505-527.

Olfactory meningiomas represent about 13 percent of all meningiomas. This is an analysis of the ocular findings in sixteen proved cases. Of this group there was papillary stasis in eight cases, bilateral optic atrophy in three, papillary stasis with secondary atrophy in two cases, and in one case the fundi were normal. No typical case of Foster-Kennedy syndrome was noted, but there were two atypical cases. Lowered vision resulted from direct compression of the optic nerves

and to a much less degree from papillary stasis. No entirely characteristic visual-field changes were found. There was one case of total blindness and two of unilateral blindness. Central scotomata were found four times. Hemianopsia was noted in three patients. Exophthalmos was found three times. The differential diagnosis is discussed.

John C. Long.

Nikolajeva, M. C. **Clinical and anatomo-pathologic changes in brucellosis.** Viestnik Opht., 1937, v. 11, pt. 2, p. 187.

A report of two cases, one with histologic data. The conclusions are that the ocular symptoms of brucellosis are protean in character. The part most frequently involved is the anterior portion of the uveal tract. Paralysis of the oculomotor is associated with involvement of the central nervous system. The pathologic picture was that of a diffuse nonspecific chronic exudative inflammation, with a tendency to hemorrhage. (Illustrations.) Ray K. Daily.

Santonastaso, A. **The experimental reproduction of leprosy.** Ann. di Ottal., 1937, v. 65, May, 321.

The author discusses previous work on this subject. He gives in detail his own experiments in which the anterior chambers of rabbit eyes were inoculated with leprous material taken from the human subject. Biologic and histologic observations were made during periods varying from thirty days to fifteen months. The conclusion reached is that none of the experiments reported in the literature warrant the belief that leprosy can be transmitted to the lower animals. (4 plates, 22 figures, bibliography.) Park Lewis.

Sie, B. L. **Investigations concerning the vitamin-A content of the blood of some patients with A-avitaminotic eye symptoms.** Arch. f. Augenh., 1937, v. 110, Nov., p. 610.

The blood examination of normal Javans disclosed that their vitamin-A content was generally much lower than that of Europeans. This is due to poorer nutrition. In examination of sixteen persons who came into the clinic with complaints relating to vitamin-A deficiency, such as severe xerophthalmia, or nightblindness with or without Bitot's spots, it was found that the vitamin-A content of the blood serum was at a very low level. In three cases it was entirely absent, although carotene was present even in these cases. On a rich vitamin-A diet the clinical symptoms quickly disappeared and the vitamin-A level in the blood rose sharply, except in three cases where the vitamin-A content of the blood remained at a very low level in spite of the fact that the clinical symptoms disappeared entirely. R. Grunfeld.

Spero, G. D. **A case of lymphocytic meningitis with ocular findings.** Arch. of Ophth., 1937, v. 18, Sept., pp. 428-430.

This condition, which occurs chiefly in young persons, seems to be on the increase. The disease is peculiar in that while it is characterized by a surprising severity of symptoms yet recovery is prompt and complete. The case of a youth of fifteen years is recorded in detail and the differential diagnosis is outlined. J. Hewitt Judd.

Spiratos, S. **The pneumococcus, pathogenic and saprophytic agent in the eye.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n.s., July, p. 589.

This is a study on the presence and toxicity of the pneumococcus in the normal eye, in cases of acute conjunctivitis, and in cases of hypopyon ulcer.

The authors found that the various types of pneumococcus were in the following percentages, about the same in the normal and the pathologic eye: type 1, about 2 percent; type 2, about 18 percent; type 3, about 18 percent; type 10, about 62 percent. Of all the pneumococci found 33 percent were toxic for the white mouse, and around 40 percent were not. Of type 2, 66 percent were toxic for the white mouse. Of type 3, 82 percent were toxic. Group 10 was toxic as to 25 percent. Of the different types coming from the conjunctiva, 26 percent were toxic for the white mouse. On the other hand, 58 percent of the pneumococci coming from hypopyon ulcer were toxic. Of nine pneumococci isolated from normal eyes five were found toxic for the white mouse. A very interesting observation is that in the normal conjunctival cul de sac a toxic pneumococcus can exist as a saprophyte without provoking any pathologic phenomena in conjunctiva or the cornea. The author believes that this saprophyte, in order to become pathologic, must find favorable conditions such as lowered resistance in the bulbar tissues or in the general health. (Bibliography, chart.)

Derrick Vail.

Valle, Sergio. **Prophylaxis of blindness in leprosy.** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, Oct., p. 865.

One does not see ocular lesions, characteristic of leprosy, in patients whose faces do not present tubercles, infiltration, or anesthesia. Leprous lesions are exceedingly rare at the posterior pole of the eye, and one never sees posterior ocular leprosy without at the same time discovering serious lesions of the anterior segment. From a prophylactic point of view the author considers that the path of the infection is through the anterior vessels, that is to say along the anterior ciliary arteries anastomosing with the posterior conjunctival vessels coming from the supraciliary region of the lids, from the neighborhood of the ears, and from the eyebrow. Therefore, in order to avoid blindness it is necessary to cauterize around the limbus, to perform a peritomy, to extirpate the tubercles of the limbus, and to follow with superficial cauterization. To combat active lesions copper salts are very valuable. Iridectomy is used when there are evidences of glaucoma. In the acute crisis accompanied by persistent pain, trypan blue, used according to the method of Muir and Chatterji, gives entire satisfaction. Focal infections are not taken into consideration. Colored glasses are found to be valuable in relieving the photophobia and protecting the cornea. The patient should be kept under constant observation.

Derrick Vail.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Bailliart, P. **Professor F. de Lapersonne (1853-1937).** Rev. Internat. du Trachome, 1937, v. 14, July, p. 161.

An obituary.

Bussy, L. **Étienne Rollet (1862-1937).** Arch. d'Opht. and Rev. Gén. d.Opht., 1937, v. 1, n.s., Aug., p. 681.

An obituary.

Heine, L. **Stories about Uhthoff.** Klin. M. f. Augenh., 1937, v. 99, Oct., p. 528.

A series of professional and personal anecdotes from the author's many years of acquaintance with Uhthoff.

Krachmalnikov, L. L. **Ophthalmologic courses for physicians in other**

specialties. Viestnik Opht., 1937, v. 10, pt. 6, p. 881.

An educational program to meet public health needs. Ray K. Daily.

Lancaster, W. B. **Lighting standards.** Amer. Jour. Ophth., 1937, v. 20, Dec., pp. 1221-1231.

Pilman, N. I., and Pokrovskii, A. I. **The question of ocular efficiency in the practice of the medical expert of labor boards.** Viestnik Opht., 1937, v. 11, pt. 2, p. 244.

The task of the oculist on the board is to determine the extent of the ocular injury, the extent of disability, and the need for a vocational change. Critical review of the records of three years work leads the author to believe that the most important problem of the board is vocational rehabilitation, in order to utilize the remaining productivity of the injured person.

Ray K. Daily.

Rostkowski, Louis. **Methods used in the fight against trachoma in Poland.** Rev. Internat. du Trachome, 1937, v. 14, July, p. 211.

This is an account of the organization and measures taken in combating trachoma in Poland.

J. Wesley McKinney.

Schweig, Josef. **The fight on trachoma in Lodz in 1933-1935.** Klinika Oczna, 1937, v. 15, pt. 4, p. 493.

The effectiveness of the antitrachomatous campaigns was demonstrated in a follow-up investigation of 639 school children treated in 1923-1928 for trachoma. In only nine of these was the disease still active. Ray K. Daily.

Sluskowska-Demantova, A. **The rôle of the Ophthalmologic Institute in the fight on trachoma.** Klinika Oczna, 1937, v. 15, pt. 4, p. 481.

A tabulated analysis of patients treated at the hospital from 1931 to 1935. The study shows a constant reduction in the number of cases, and in the severity of their complications. The author credits this to the effective work of the antitrachomatous dispensaries.

Ray K. Daily.

Strebel, J. **Diagnosis of the eye disease of Saint Francis of Assisi. The cause of death of A. Dürer.** Klin. M. f. Augenh., 1937, v. 99, Aug., p. 252. (See editorial, Amer. Jour. Ophth., 1938, v. 21, p. 74.)

Velter, E. **Felix de Lapersonne (1853-1937).** Arch. d'Opht. and Rev. Gén. d'Opht., 1937, v. 1, n.s., Aug., p. 673.

An obituary.

Zimkin, V. R. **The state of accommodation in shooting with fire arms.** Viestnik Opht., 1937, v. 11, pt. 2, p. 234.

The objective of this study, by the psychophysiological department of the Medico-Military Academy, was to determine the process of accommodation in shooting with rifles, with the view of applying the data to selection of sharpshooters and the manufacture of firearms. Helmholtz believed that the sharpshooter focuses the sight and sees the target in diffusion circles. Zulzer maintained that the after image of the target permitted clear simultaneous fixation of the target and the sights, and that the retinal image of the target might be calculated from the size of the target and its distance from the eye. The data of this investigation refute Zulzer's contention, and show that the shooter when aiming does not accommodate for any one of the three fixation objects, but for a point close to the

barrel sight which gives him the clearest image of the sights and target. The accommodative effort differs with different people and varies in the same person, depending on the conditions which influence the visibility of the target and sights, such as density of atmosphere, illumination, visual acuity, and range of accommodation. The size of the retinal image of the target cannot be calculated. Therefore, the selection of sharp shooters should take into consideration such factors as range of accommodation, maintenance of clear vision, and nystagmus. In the manufacture of rifles the sights should be large, so they may be seen well in focus as well as in diffusion circles.

Ray K. Daily.

19

ANATOMY, EMBRYOLOGY, AND COMPARATIVE OPHTHALMOLOGY

Fortin, E. P. **The double fovea of birds.** Arch. de Oft. de Buenos Aires, 1937, v. 12, Sept., p. 565.

Study of the retina of the falcon shows it to have two foveas, one central and one lateral. Both are characterized by absence of the Henle layer and by the presence of a true excavation. There is no true excavation in the fovea of the primate, and there is, on the other hand, marked development of the Henle layer. The histology of birds' eyes therefore is not applicable to the primates and has led to errors. (Photomicrographs.) M. Davidson.

Lijo Pavia, J. **Direct ophthalmoscopy at a distance without an opththalmoscope.** Arch. de. Oft. de Buenos Aires, 1937, v. 12, Sept., p. 562; also Rev. Oto-Neuro-Oft., 1937, v. 12, Oct., p. 257.

The case was one of aniridia combined with aphakia. M. Davidson.

Stone, L. S. **Return of vision and other observations in grafted vertebrate eyes.** Amer. Jour. Ophth., 1938, v. 21, Jan., pp. 1-6.

NEWS ITEMS

Edited by Dr. H. Rommel Hildreth
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News items should reach the Editor by the twelfth of the month

Deaths

Dr. James Henry Andrew, Brooklyn, died November 26, 1937, aged 63 years.

Dr. William Merle d'Aubigne Carhart, Peekskill, New York, died November 13, 1937, aged 73 years.

Dr. Frank Wallace Miller, Los Angeles, died November 1, 1937, aged 66 years.

Miscellaneous

The American Board of Ophthalmology announces that in 1938 it will hold examinations at San Francisco, June 13th, during the meeting of the American Medical Association; at Washington, D.C., October 8th, during the meeting of the American Academy of Ophthalmology and Otolaryngology; at Oklahoma City, November 14th, during the meeting of the Southern Medical Association. Applications should be filed immediately. The required number of case reports must be filed at least 60 days prior to the date of the examination. Application blanks may be procured from: Dr. John Green, 3720 Washington Avenue, St. Louis, Missouri.

Up to the end of 1937, the Board had held 56 examinations and had certified 1,498 ophthalmologists. The Board on January 1, 1938, issued a new and complete list of physicians certified to date, arranged geographically. This list was mailed gratis to all certified persons and to over 250 hospitals and institutions. In future issues of the directory of the American Medical Association certified ophthalmologists will be so designated in their listing. The American Board of Ophthalmology has established a preparatory group of prospective candidates for its certificate. The purpose of this group is to furnish such information and advice to physicians who are studying or about to study ophthalmology as may render them acceptable for examination and certification after they have fulfilled the necessary requirements. Any graduate or undergraduate of an approved medical school may make application for membership in this group. Upon acceptance of the application, information will be sent concerning the ethical and educational requirements, and advice to members of the group will be available through preceptors who are members or associates of the board. Members of the group will be required to submit annually a summarized record of their activities. The fee for membership in the preparatory group is $10.00, but this amount will be deducted from the $50.00 ultimately required of every candidate for examination and certification. For sufficient reason, a member of the preparatory group may be dropped by vote of the board.

During the month of May the Department of Ophthalmology of Harvard University is conducting an all-day, four-weeks' graduate course in "Recent advances in ophthalmology." This course is given at the Massachusetts Eye and Ear Infirmary, the entire staff participating, and is open only to men or women qualified in ophthalmology, but not to beginners. It correlates advances in fundamental science with clinical ophthalmology, and affords an opportunity for study of pathological sections, neuro-ophthalmology, preoperative and postoperative treatment with ward rounds, ocular complications in general diseases, and physiological optics applied to refraction. If sufficient applications are received by April 1st, an all-day two-weeks' course in ocular muscles will be given by Harvard Medical School at the Massachusetts Eye and Ear Infirmary by Drs. Bielschowsky and Casten from April 18th-30th, inclusive.

The University of Buffalo awards annually a gold medal for work in ophthalmology. Details may be had by addressing H. W. Cowper, 543 Franklin Street, Buffalo, New York.

To secure wider distribution of its book "Eye hazards in industrial occupations" by Louis Resnick and Lewis H. Carris, the National Society for the Prevention of Blindness is now offering copies at the special price of 50 cents each as long as the supply lasts. This book, which formerly sold at the actual cost price of $1.50, was published in 1924. Although some of the photographs show safety devices which have since been improved upon, the contents remain a valuable guide to safe practices in industry.

The volume contains 247 pages, and includes 59 illustrations dealing with the safeguarding of eyesight in factories, mines, shops, and offices. Orders or inquiries concerning this volume should be addressed to the National Society for the Prevention of Blindness, 50 West 50th Street, New York City.

Societies

The Oregon Academy of Ophthalmology and Otolaryngology together with the University of Oregon Medical School have procured as guest speakers for their third annual Spring Postgraduate Course, April 3d to 9th, Dr. A. C. Fuerstenberg, dean of the University of Michi-

gan Medical School and head of the Department of Otolaryngology, and Dr. Sanford Gifford, head of the Department of Ophthalmology of Northwestern University Medical School.

The Eye Section of the Philadelphia County Medical Society presented the following program on February 3, 1938: Clinical cases from Temple University Hospital, by Dr. Louis R. Wolf; Visualizing the pathogenesis of senile cataract, by Dr. Aaron Brav; Anatomy and functions of the orbital fascia, by Dr. Charles W. Le Fever; Differentiating the various types of blurred optic discs, by Dr. Glenn G. Gibson.

At the annual meeting of the Chicago Ophthalmological Society the following officers were elected for the year 1938-39: president, Dr. Georgiana D. Theobald; vice-president, Dr. Leo L. Mayer; councilor, Dr. E. G. Nadeau; Dr. Earle B. Fowler was reëlected secretary-treasurer.

The Washington, D.C., Ophthalmological Society presented the following program on November 1, 1937: Bilateral optic atrophy of undetermined origin, by Col. F. H. Thorne; Spontaneous hemorrhagic detachment of the choroid, by Dr. Ronald Cox; Congenitally dislocated lens with arachnodactyly, by Dr. Harold Downey; A metallic foreign body perforating the cornea, lens, and posterior pole of the eye with retention of vision, by Dr. Oscar Wilkinson; The management of intraocular nonmagnetic foreign bodies, by Dr. George H. Cross, of Chester, Pennsylvania.

A meeting of the executive committee of the International Organization against Trachoma was held on December 9, 1937, at the Semiramis Hotel, Cairo. The subvention given for purposes of research by the American Academy of Ophthalmology and Otolaryngology, $100.00, was allocated to Dr. Poleff of the Pasteur Institute at Rabat, Morocco. It was decided to hold the next meeting of the organization at the same place, and at the same time, as the next meeting of the International Council of Ophthalmology in the year 1939.

The Annual Congress of the Ophthalmological Society of Egypt will take place at the Memorial Ophthalmic Laboratory, Giza, on March 25, 1938.

Personals

St. Bartholomew's Hospital, London, England, has added to its staff, by election, Mr. Rupert Scott as Ophthalmic Surgeon, and Mr. R. Foster Moore, O.B.E. as Consulting Ophthalmic Surgeon. Mr. Keith Lyle has been appointed Assistant Ophthalmic Surgeon to the National Hospital, Queen Square. Mr. H. B. Stallard has been elected Assistant Ophthalmic Surgeon to St. Bartholomew's Hospital while Mr. E. F. King has been elected to the same position to the Westminister Hospital.

Prof. A. Peters of Rostock recently celebrated his seventy-fifth birthday. It is a source of great satisfaction to him that since his retirement he has been able to work daily in the library of his old clinic.

Dr. Carl Zimmermann of Milwaukee recently paid a visit to his daughter at Buenos Aires, Argentina.

Dr. Gaynelle Robertson, who has just returned from a trip around the world, has returned to the Bay region and announced the opening of her offices in Berkeley.

Dr. C. Allen Dickey, the secretary of the Pacific Coast Oto-Ophthalmological Society, and formerly associated with Dr. Joseph L. McCool, recently opened his office at 450 Sutter.

Dr. George Campion has just returned from six months of study abroad, following the completion of his residency at the University of California Medical School. He is now associated in private practice with Dr. Joseph W. Crawford.

Dr. Carroll Smith of Spokane has announced the association of Dr. Robert L. Pohl with him in his practice.

Prof. Alfred Bielschowsky on the night of January 31st delivered a lecture on the subject of aniseikonia to the Eye Section of the San Francisco County Medical Society.

Drs. Dohrmann Pischel, George S. Lachman, William E. Borley, Miriam Miller, Samuel Aiken, and Frederick C. Cordes were among those who attended the mid-winter postgraduate course at Los Angeles.

Professor Weil, head of the University Eye Clinic in Strasburg is going into pension and his successor is the laboratory chief, Dr. Eduard Redslob. Redslob is a member of the editorial staff of the Annales d'Oculistique, and has published much of his work on the histology of the eye.

Dr. Moacyr Alvaro has recently been appointed as full professor of ophthalmology at the Escola Paulista de Medicina, São Paulo, Brazil. Dr. M. Davidson of New York, during his recent visit to various South American countries, had a very pleasant visit with Dr. Alvaro, as well as with D. Belgeri and D. Lijo Pavia.

At the New Orleans Graduate Medical Assembly, March 7, 8, 9, and 10, 1938, Dr. Algernon B. Reese, New York, was guest speaker in ophthalmology.